

5.0 DESCRIPTION OF PCB WASTES

As described in the previous sections, the facility will receive used PCB oil for re-refining. In the event of closure of the facility, the potentially PCB-contaminated wastes would include contaminated soil, groundwater, building materials, or the concrete dikes and pavement. Rinsate water and decontamination wastes will also be generated during closure of the facility.

6.0 ESTIMATE AND MANAGEMENT OF MAXIMUM INVENTORY

6.1 Maximum Waste Inventory

PCB oil storage maximums are limited by the tank capacities. Table 2 below shows the maximum potential PCB oil inventory for the site:

Table 2
PCB Oil Storage

Location	Oil Stored	Number and size(s) of tanks
Dike C	PCB oil feedstock	Two 8,200-gallon tanks
Building F	Feedstock Oil (non-PCB or PCB)	8,200-gallon tank
TOTAL CAPACITY		24,600 gallons

Normal operation of the facility anticipates utilizing only the tanks in Dike C for PCB oil.

6.2 Management of Maximum Inventory

In the event of closure of the facility, it is anticipated that all of the PCB oil inventory would be re-refined on site to render the oil non-PCB oil. If re-refining on site is not possible, the PCB oil inventory would be loaded onto trucks and/or rail cars and transported to another PCB oil re-refiner or to a licensed disposal or treatment facility. The particular facility will be selected prior to commencing closure activities based on available, permitted facilities at the time. Currently, Environmental Protection Services, Inc. in Wheeling, West Virginia offers permitted dechlorination of PCB oil and may be used for treatment of PCB oil that remains at the site at closure.

Additional PCB-contaminated waste may be generated during closure, such as the storage tanks, pumps, piping, contaminated concrete or soil, or rinsates from decontamination activities.

6.3 Containerization and Transport

Hydrodec will comply with the land disposal restrictions (LDR) by determining if any waste shipped off site for disposal is restricted, and by providing the proper certification and notification statements to the off-site facility, in accordance with Federal and State regulations. To achieve clean closure, it is anticipated that impacted materials designated as regulated wastes can be containerized in either 55-gallon drums or steel roll-off boxes and disposed of in accordance with LDRs at an appropriately permitted landfill. The disposition of materials shipped from the Hydrodec facility at closure will be limited by the characteristics of the waste and based on the results of sample analyses following treatment and/or decontamination. Facilities being considered for disposal of equipment and closure-generated wastes are as follows:

- TSCA regulated non-liquid PCB wastes will be disposed of at Wayne Disposal, Inc. in Belleville, Michigan.
- TSCA regulated liquid PCB wastes (rinsate) will be sent to Veolia Environmental Services Technical Solutions, LLC in Port Arthur, Texas.
- Transport of wastes satisfying the LDR will be sent to Wayne Disposal, Inc. in Belleville, Michigan for disposal. This landfill also accepts wastes that are >50 ppm.

Additional options will be considered as they become available.

Containerized materials removed from the facility will be loaded into trucks and transported to the appropriate facility in accordance with the applicable Department of Transportation (DOT) regulations.

6.4 Changes in Maximum Inventory

Hydrodec does not anticipate that the maximum PCB oil inventory will increase. This Closure Plan will be updated if additional storage tanks are constructed at the facility. The amount of waste that could be generated during closure will depend upon the amount of contaminated materials that are found. Contamination will occur as a result of accidental spills, leaks, etc., at the facility and in the absence of these, significant contaminated media is not expected at this time.

7.0 CLOSURE PROCEDURES

Following the processing and elimination of the PCB oil inventory, the PCB oil management areas at Hydrodec, including structural materials, treatment equipment, and ancillary components, will be inspected, decontaminated, evaluated, dismantled, and disposed of as necessary to achieve the clean closure objectives. It is anticipated that all structures will be decontaminated and cleaned, closed in place, and that demolition will not be necessary. Areas and equipment that have been exposed to PCB-contaminated waste will be decontaminated in accordance with 40 CFR 761.79 and/or 761 Subpart G. If the inspection and sampling of the concrete containment structures or floors indicate that contamination could have reached the soil under or surrounding the concrete areas, then soil sampling will be conducted. If sample results indicate the soils have been impacted by operations of Hydrodec (i.e., exceeding the closure standards specified in Section 12), the impacted soils will be excavated and treated or stabilized to the extent required for land disposal or, if possible, remediated on site to meet the applicable cleanup levels and left on site.

Clean closure of the Hydrodec PCB oil handling process will require the removal and disposal of all PCB oil present at the site, inspection of the concrete containment and floor areas, decontamination or removal of contaminated process equipment and contaminated structural components, decontamination of all impacted building and dike surfaces, and removal of any contaminated soil within the facility boundary. Any materials, equipment, or structures removed from the Hydrodec facility will be designated and disposed of accordingly. The Hydrodec facility will be considered clean closed when the sampling of the structures (if required) and surrounding soil (if sampled) shows that the concentrations of PCBs are present at or below acceptable limits specified in Section 10.0.

This section provides a detailed description of the closure activities to be implemented in completing final closure of the PCB oil handling process at Hydrodec. These activities are discussed in their anticipated sequence of implementation.

7.1 Notification

The Ohio EPA and U.S. EPA will be notified at least 60 days prior to the date on which final closure activities are expected to begin.

7.2 Inspection

Before beginning decontamination, but after the PCB oil has been removed, a visual inspection of waste storage and processing areas, load/unload areas, and surrounding soils will be conducted. The inspection will identify and record locations:

- That have been discolored or visually altered by PCB oil handling activities.
- Where cracks are apparent, epoxy and/or sealant coating appears to have been damaged, or any other openings through which oil, waste, debris, or decontamination media could be release to the soil.

A record of the location and dimensions of these areas from a specified fixed point will be mapped and photographed, with documentation kept in the facility operating records for referencing during the sampling. Areas of soil with these characteristics will also be marked using stakes.

Floor areas of the PCB oil storage and processing areas that have been identified as potentially compromised will be repaired with the same or equivalent materials that were used for their original construction. If appropriate, an epoxy coating will be applied to the repaired areas. These measures should ensure that the repairs are resistant to water and the cleaning solutions that will be used during decontamination.

The concrete areas where visible contamination was noted during the inspection, will be subjected to decontamination procedures. Areas of visible soil contamination will be sampled to identify the concentration of PCBs in the soil.

If the concrete areas do not show any visible staining, cracks, or openings, the concrete will be randomly sampled as discussed in Section 8.0 to confirm that the surfaces meet the clean closure criteria.

7.3 Decontamination Procedures for PCB-Contaminated Structures and Equipment

Non-porous (smooth, solid surfaces) equipment or areas contaminated with PCBs may be wipe sampled and analyzed to determine if the clean closure criterion of 100 micrograms

(µg) PCBs/100 square centimeter (cm²) is met. If this criterion is met, no additional decontamination for PCBs will be performed. If not wipe-sampled, such equipment will be decontaminated, dismantled, and shipped off site.

For porous surfaces (e.g., structural surfaces such as floors, walls, ceilings made of concrete, brick, wood, plaster, plasterboard, etc.), and bulk remediation waste (soils) "clean" is defined by a bulk PCB concentration (e.g., weight/weight or volume/volume) such as a core or chip sample and not a surface PCB concentration, such as a wipe sample. The core or chip sample must be analyzed to determine if it meets the clean closure criterion of < 25 ppm PCBs. All areas and equipment that do not meet the clean closure criterion will be decontaminated in accordance with 40 CFR 761.79 and/or 761.61. If decontamination cannot be achieved, the concrete will be disposed of off site as PCB-contaminated waste.

The decontamination solvent may be reused for decontamination until it contains 50 ppm PCB or more. All solvents and rinse waters will be captured by the containment dike or building sumps. This liquid will then be pumped into containers (e.g., 55-gallon drums) by a diaphragm or sump pump. All pumping and storage equipment will be designated for use in PCB-contaminated areas only until it can be decontaminated with these same procedures. No equipment will be removed from these areas until this decontamination process and the verification sampling described in Section 8.0 is completed.

Following is a brief summary of the procedures the facility will use to achieve clean closure:

1. Remove any existing oil in the storage tanks for on-site processing or off-site treatment or disposal.
2. All structures (dikes, buildings) and equipment (piping, pumps, valves, hoses) will be inspected and as necessary, decontaminated as described below. Rinsate water will be collected, tested, and transported to an approved facility.
3. To demonstrate the ability of the facility to meet clean-up standards, confirmation samples (core, chip, wipe, or cleaning solution) will be obtained from equipment and structures.

4. If necessary, surface and subsurface confirmation samples will be collected and analyzed according to the sampling protocol provided in Section 8.0. If contamination is found, the contaminated structures and soil will be removed for off-site PCB waste destruction/disposal at a permitted facility.

All reusable equipment that may come in contact with potentially contaminated concrete, metal, soil, sediment or water during site cleanup will be decontaminated. Containers (roll-off bins) will be lined with visqueen plastic prior to placing any contaminated debris in to the roll-off bin. Decontamination of reusable equipment as well as floors, walls and other structural items at the site will consist of steam-cleaning (high pressure, hot water washing) or phosphate-free detergent wash and clean water rinse. All decontamination fluids will be collected and temporarily stored in a holding tank and analyzed prior to disposal. Stored fluids will be managed in accordance with the discussion in Sections 6.2 and 6.3. Confirmation sampling is described in Sections 8.0 and 9.0. Decontamination procedures for sampling equipment are described in Section 8.6.

7.4 Tank Decontamination

The tanks will be decontaminated by a double-rinse pressure washing as follows below:

1. Tank entry will follow standard confined space entry procedures.
2. Pumps and piping must be drained and blinded prior to tank entry.
3. Prior to tank entry, vapor space will be tested and monitored utilizing a three-gas confined space meter to assure the atmosphere is safe for entry and continued occupation.
4. The tank entry/decontamination team will consist of a minimum of three people. The job requires a "confined space entry supervisor" to complete the confined space entry permit. A minimum of one "hole watch," and one entrant are required whenever it is necessary to enter into a tank. Entrants remove contaminated sludges with a shovel or scraping tool. The tank will then be double-rinsed with a pressure washer. The rinse water will be pumped to the rinsate holding tank with an air driven diaphragm pump.

5. Upon completion of the cleaning, the tank will be visually inspected for residues and wipe sampled as described in Section 8.0.

The tanks are nonporous and as a result, decontamination using steam cleaning should achieve sufficient decontamination. Decontamination water being collected in the secondary containment area will be pumped into temporary storage container (e.g., 55-gallon drums or tanker truck) using sump or diaphragm pumps. Abrasives blasting (for steel) may additionally be used for components that are not readily decontaminated by steam cleaning.

Some equipment may continue to be contaminated following decontamination. These components shall be dismantled and transported off site for disposal at an appropriate disposal facility. Otherwise, decontaminated tanks will remain at the site or be transported off site for recycling, reuse, or disposal in an appropriately permitted solid waste landfill.

7.5 Facility Equipment

Facility equipment such as: pumps, hoses, shovels and piping, will be double rinsed. The rinsate water will be collected in drums or with a vacuum truck for off-site treatment/disposal. A sample of a third rinse of the equipment will be collected to verify it has been decontaminated to the closure standard in Section 10.0. Once laboratory analysis verifies the equipment has been decontaminated, the components will remain at the site or be transported off site for recycling, reuse, or disposal in an appropriately permitted solid waste landfill. If it cannot be decontaminated, then it will be sent off site as PCB-contaminated waste to a PCB disposal facility.

7.6 Dikes and Floors

Hydrodec intends to leave the concrete containment structure in place after inspection and decontamination, as necessary. Concrete containment and floor surfaces, including the sumps, indicating staining or cracks will be decontaminated with physical extraction technology to meet the clean debris surface standard, that is, removal of at least 0.6 centimeter (cm) (0.24 inch) of concrete using abrasive blasting, scarification, grinding and planning, or vibratory finishing. Appropriate safeguards will be used to minimize the release of particulate matter to the ambient air. The removed material will be placed into containers and disposed at a permitted PCB waste disposal facility. Scrapers, chippers, or

grinders may be used in physical extraction decontamination activities. Concrete containment surfaces will be considered decontaminated when at least 0.6 cm of the surface layer has been removed and they have met the cleanup standard. Confirmation sampling, as described in Section 8.0, will indicate if the concrete remains contaminated following decontamination. If scarification cannot decontaminate the concrete to the cleanup level, then the contaminated concrete will be removed for off-site disposal. Otherwise, the decontaminated concrete will remain on site. For purposes of the closure cost estimate, Hydrodec has assumed that the concrete containment structure can be successfully decontaminated.

7.7 Soil/Sediment Removal and Remediation

Soil contamination is not anticipated for the site. However, if soil sampling is conducted based on conditions at the site or contamination of the containment structures and the results indicate contamination, the impacted soils will be excavated by hand or using standard construction methods, containerized, and disposed of at an appropriately permitted facility.

It is not anticipated that the pond sediments will indicate the presence of PCBs. If, however, the sediments are sampled due to site conditions, and sediments do show an impact, then the pond will be dredged to remove the contaminated sediments and then confirmation samples will be collected to verify all contamination (above cleanup levels) has been removed.

8.0 CONFIRMATION SAMPLING PLAN FOR STRUCTURES AND EQUIPMENT

8.1 Objective

The objective of confirmation sampling for structures and equipment is to ensure that the remaining structures associated with the Hydrodec site and items used in the process of closing the Hydrodec site, such as sampling instruments, and cleaning equipment, if needed, are not contaminated and meet cleanup standards, presented in Section 10.0. A detailed Sampling and Analysis Plan (SAP) will be developed prior to closure activities that will reflect the conditions of the facility at the time of closure, but a general discussion of the anticipated equipment and structures sampling at the site is discussed here.

8.2 Sampling

8.2.1 Non-Porous Surfaces (Tanks, Piping)

Following decontamination of the PCB-contaminated processing equipment and storage tanks, wipe samples will be collected from equipment and surfaces that have contacted PCB-containing wastes in accordance with 40 CFR 761 Subpart P (761.300-761.316). Three wipe samples, at a minimum, will be collected from each tank. If concentrations in a standard wipe sample exceed $100 \mu\text{g}/100 \text{ cm}^2$, the surface will be decontaminated again using the same procedures but with a different cleaning solution. These areas will be scrubbed with other solutions, such as sodium triphosphate, until a wipe sample result below $100 \mu\text{g}/100 \text{ cm}^2$ is obtained and the area is visibly clean. If this standard cannot be achieved the equipment will be disposed of off site as PCB-contaminated waste. Wipe samples will be collected and analyzed in accordance with the standard wipe test procedures in 40 CFR 761.123, 761 Subpart P, and U.S. EPA guidance documents.

8.2.2 Equipment (Pumps, Filters, etc.)

The use of wipe samples to confirm that decontamination was successful for small pieces of equipment (e.g., pumps, filters, etc.), is not appropriate. Therefore, a sample of the final rinse of the equipment will be collected for analysis. If the analysis confirms that the

sample is <3 ppb PCBs, the equipment will be considered decontaminated. If not, the equipment will be sent off-site for disposal as PCB-contaminated waste.

8.2.3 Porous Surfaces (Concrete)

To confirm clean conditions and/or following decontamination of the concrete surfaces (dikes, floors), chip samples will be collected and analyzed from the surfaces in accordance with 40 CFR 761 Subpart O (761.280 – 761.298). In this method, the surface of the material is chipped out using tools such as a chisel or an electric hammer. The chip sample should have a size approximately 10 cm by 10 cm in area and 0.125-inch in depth. A grid system, laid out at 1.5 meters apart, will cover each area to establish sample points. Random sample locations will be chosen. Compositing of samples will be conducted in accordance with 761.289, and a minimum of three samples per area (each dike, building floor, piping run) will be submitted for analysis. If the concentration in a chip sample exceeds < 25 ppm, the surface will be decontaminated again using the same procedures until a chip sample result below < 25 ppm is obtained and the area is visibly clean. If this standard cannot be achieved, the concrete will be disposed of off site as PCB-contaminated waste.

8.3 Analytical Methods

Either Method 3500B/3540C or Method 3500B/3550B from U.S. EPA's SW-846, Test Methods for Evaluating Solid Waste, or a method validated under Subpart Q of 40 CFR 761, will be utilized for chemical extraction of PCBs from individual and composite samples. U.S. EPA SW-846 Method 8082, or a method validated under Subpart Q, will be used to analyze the extracts for PCBs.

Sample concentrations for non-liquid PCBs will be reported on a dry weight basis as micrograms (μg) of PCBs per gram of sample (ppm by weight). Surface sampling (wipe samples) results will be reported as $\mu\text{g}/100\text{ cm}^2$. Divide 100 cm^2 by the surface area and multiply this quotient by the total number of micrograms of PCBs on the surface to obtain the equivalent measurement of micrograms per 100 cm^2 . Liquid PCB sample concentrations will be reported on a wet weight basis as micrograms of PCBs per gram of sample (ppm by weight).

Field sampling procedures and laboratory analyses will be evaluated through the use of Quality Assurance/Quality Control (QA/QC) samples to assess the overall quality of the

data produced. The types of field QC samples that will be collected include trip blanks, field blanks, and field duplicates, as appropriate. Quality Control (QC) samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. Analytical data generated as a result of the activities described in this Closure Plan will be verified and validated by the analytical laboratory. Data reduction will involve the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests. At a minimum, analytical reports will include: a listing of each analyte; the analytical result for each analyte; units; the dilution factor, if any; the detection limit; and any laboratory-assigned qualifiers or codes. The results from QC samples such as blanks, spikes, calibrations, and reference to standard methods will also be included.

All samples will be submitted to the laboratory using standard Chain-of-Custody documentation.

8.4 Sampling Equipment Decontamination

All tools that come into contact with potentially contaminated material will be decontaminated after each use. The procedure that will be followed includes, but it not limited to:

- Tools will first be rinsed in a PCB-compatible solvent and then washed in an Alconox soapy-water solution made from clean water. A brush may be used to facilitate the process.
- The tools will be rinsed in a clean water rinse.
- The tools will be rinsed in a second clean water rinse.
- Rinse and wash waters will be changed frequently.
- The tools will be allowed to air dry before use.
- The tools may be wrapped in foil to prevent re-contamination during storage or transportation.

All wash and rinse waters and any equipment that cannot be decontaminated will be placed in DOT-approved 55-gallon drums, labeled, and manifested for off-site disposal at a licensed PCB facility.

9.0 SOIL/SEDIMENT SAMPLING PLAN

The PCB oil storage areas at Hydrodec are designed and will be maintained to prevent spills and leaks from occurring that could impact the environment. Therefore, Hydrodec does not anticipate contamination of soil, groundwater, or other environmental media. Unless stained concrete or cracks or openings in the containment or on the concrete surfaces are noted, soil sampling will not be conducted. If necessary, the Closure Plan will be revised and a detailed SAP will be developed prior to closure activities that will reflect the conditions of the facility at the time of closure. For information sake, a general discussion of the potential soil and sediment sampling at the site is discussed in the following subsections.

9.1 Subsoils

Prior to decontamination, the concrete floors of the containment dike and other areas where PCB oils were managed will be inspected for cracks, discoloring, and damaged epoxy coatings. If no cracks, discoloring, or damaged epoxy coatings are noted during visual inspection, no sampling of the subsoils will be conducted. If cracks or flows are observed, their locations will be recorded in the operating record during the inspection. If such evidence of damage is noted, soils from beneath the concrete will be sampled in two phases, biased and unbiased. Soil sampling underneath the concrete will be accomplished using a core driller, jack hammer, or diamond blade concrete saw. After the concrete is removed, a hand auger will be used to collect soil samples.

The first sampling phase will involve collecting biased samples from the uppermost 3 inches of subsoil beneath the concrete and submitting them for confirmation analysis. During the first phase, samples will be collected from the following areas: (1) locations where concrete sampling verified contamination, (2) beneath the location of sumps, (3) locations beneath apparent cracks in the concrete and where the epoxy coating appears to have been damaged, and (4) areas where PCB oils were managed. A grid system overlaying the area to be sampled will be established to ensure full coverage of the area and to document the sample locations. These soil samples will be submitted for analysis of PCBs.

Should laboratory analysis of these samples indicate subsoils beneath the concrete have been impacted by the operations (e.g., concentrations exceed the cleanup levels outlined in Section 10.0), the second phase of sampling will be performed to evaluate the extent of subsoil contamination and the potential for impacts to groundwater. Sample locations with PCB levels above cleanup levels will be marked on the grid system established for the unbiased sampling. This grid will then be sampled at a depth of 2 feet and the surrounding grids will be sampled at the 3-inch depth. This sampling will continue out and down at increments of 2 feet until the depth and location of the hot spot is delineated. If it is determined that there is a potential for impact to the groundwater, an amended Closure Plan will be written to address this situation.

9.2 Pond Sediment

If staining of the concrete areas outside the containment areas and buildings is noted, the sediment in the storm water pond will be sampled and analyzed to confirm that no PCB contamination is found. Three sediment samples from the pond bottom will be collected and submitted to the laboratory for analysis.

9.3 Analytical Methods

Either Method 3500B/3540C or Method 3500B/3550B from U.S. EPA's SW-846, Test Methods for Evaluating Solid Waste, or a method validated under Subpart Q of 40 CFR 761, will be utilized for chemical extraction of PCBs from individual and composite samples. U.S. EPA SW-846 Method 8082, or a method validated under Subpart Q, will be used to analyze the extracts for PCBs.

Sample concentrations for non-liquid PCBs will be reported on a dry weight basis as micrograms (μg) of PCBs per gram of sample (ppm by weight).

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. The types of field QC samples that will be collected include trip blanks, field blanks, and field duplicates, as appropriate. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. Analytical data generated as a result of the activities described in this Closure Plan will be verified and validated by the analytical laboratory. Data reduction will involve the conversion of raw data to reportable

units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests. At a minimum, analytical reports will include: a listing of each analyte; the analytical result for each analyte; units; the dilution factor, if any; the detection limit; and any laboratory-assigned qualifiers or codes. The results from QC samples such as blanks, spikes, calibrations, and reference to standard methods will also be included.

All samples will be submitted to the laboratory using standard Chain-of-Custody documentation.

9.4 Sampling Equipment Decontamination

All tools that come into contact with potentially contaminated material will be decontaminated after each use. The procedure that will be followed includes, but it not limited to:

- Tools will first be rinsed in a PCB-compatible solvent and then washed in an Alconox soapy-water solution made from clean water. A brush may be used to facilitate the process.
- The tools will be rinsed in a clean water rinse.
- The tools will be rinsed in a second clean water rinse.
- Rinse and wash waters will be changed frequently.
- The tools will be allowed to air dry before use.
- The tools may be wrapped in foil to prevent re-contamination during storage or transportation.

All wash and rinse waters and any equipment that cannot be decontaminated will be placed in DOT-approved 55-gallon drums, labeled, and manifested for off-site disposal at a licensed PCB facility.

10.0 CLOSURE PERFORMANCE STANDARDS (CLEANUP LEVELS)

Any impacts to the environment will be identified at the time of closure, and clean closure levels for applicable environmental media will be determined in accordance with the PCB Spill Cleanup Policy in 40 CFR 761.125.

Actual impacts to the soil quality resulting from operation of the Hydrodec facility will be determined as part of the closure activities as outlined in Section 7.0.

The “low occupancy” (industrial) cleanup level for PCBs is as follows:

- Bulk Remediation Waste (soil, sediment, sludge) and Porous Surfaces (concrete): < 25 ppm and an institutional control (there is an EC to restrict property usage to commercial/industrial).
- Non-porous surfaces: <100 µg/100 cm² for wipe samples and institutional control (EC); <3 ppb for equipment rinsate samples.
- Water: <3 ppb PCBs if discharged to a treatment works or <0.5 ppb PCBs for unrestricted use.
- Organic liquids, non-aqueous inorganic liquids: <2 ppm PCBs.

11.0 CLOSURE IMPLEMENTATION SCHEDULE

Hydrodec does not have a definite final closure date; however, the date of closure is estimated to be the year 2030. Closure activities for the Hydrodec facility will commence within 90 days after PCB oil stops being introduced to the facility. Certain processes may be used to facilitate closure (treatment process). Treatment and removal of all PCB oil is scheduled to be accomplished within the 90-day time frame specified in 40 CFR 761.65. Closure of the PCB-management areas is scheduled to be accomplished within the 180-day time frame specified in 40 CFR 761.65. A preliminary closure schedule is shown in Table 3 below:

Table 3
Preliminary Closure Schedule

Item	Days After Receive Final Quantity of PCBs
Notify Regional Administrator in writing	60 days prior to expected start
Begin closure activities	30
Dispose of/treat PCB oil inventory	90
Decontaminate PCB storage and treatment areas	120
Decontaminate equipment	120
Sample and Analyze	120
Dispose of decontamination residuals and rinsates	150
Complete closure	180
Submit certification of closure to U.S. EPA and/or Ohio EPA	240

12.0 CLOSURE CERTIFICATION

Within 60 days of the closure or contingent closure of the PCB oil storage and treatment facility, or final closure of the facility, completion of closure certification by a qualified, independent, registered Professional Engineer will be submitted to the EPA Regional Administrator verifying that the waste management unit has been closed in accordance with the specifications of this Closure Plan (40 CFR 761.65(e)(8)). The certification shall be signed by an authorized representative of Hydrodec and by the certifying Professional Engineer.

As part of the certification of closure, an independent qualified registered Professional Engineer will become familiar with Hydrodec's closure activities by observing field activities and reviewing records. At a minimum, this will include field observation and a review of records of the following activities:

- Removal of waste (and removal of any unit components or other materials) and disposition of waste (and other materials removed) to ensure the removal was complete and materials were properly disposed.
- Decontamination procedures and results to ensure that the Closure Plan for decontamination was followed and the clean closure standard for decontamination was achieved - this will include inspecting metal tanks and the concrete containment system after decontamination to confirm that a "clean debris surface" and other decontamination performance standards are achieved.
- Management of decontamination residuals to ensure management was properly carried out.
- Sampling procedures and results.
- Locations of sampling to ensure locations were as specified in the SAP.
- Sample labeling and handling, including chain-of-custody procedures.

Hydrodec will submit the following information to support its closure certification:

- All field notes and photographs related to closure activities, including the results of the inspection of the unit and containment system for cracks and other openings prior to decontamination.
- A description of any minor deviations from the approved Closure Plan and justification for these deviations.
- Documentation of the final disposition of all dangerous wastes and dangerous waste residues, including contaminated media, debris, and all treatment residuals.
- All laboratory and/or field data, including sampling procedures, sampling locations, QA/QC samples, and chain of custody procedures for all samples and measurements, including samples and measurements taken to determine background conditions and/or determine or confirm clean closure.
- A summary report which identifies and describes the data to be reviewed by the independent registered Professional Engineer and tabulates the analytical results of samples taken to determine and confirm clean closure.
- A description of what the unit area looks like at completion of closure, including a description of what parts of the former unit, if any, will remain after closure.

When closure is complete, the independent qualified registered Professional Engineer will sign and stamp the certification of clean closure.

13.0 SITE SECURITY

It is anticipated that existing security features will be maintained throughout the closure activities for the Hydrodec facility. The perimeter fences and locked access gates restrict unauthorized entry to the facility. Security regulates access to the facility through the front entrance.

14.0 REFERENCES

- U.S. Environmental Protection Agency. 2005. *Polychlorinated Biphenyl Site Revitalization Guidance Under the Toxic Substances Control Act*.
- 40 CFR 761 – *Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions*.
- Brownfield Restoration Group, LLC, VAP NFA Letter (June 27, 2008), *VAP Phase I and II Property Assessment* (August 4, 2004 and June 27, 2008, respectively) for Future Stein Industrial Park, 1501 Belden Avenue SE, Canton, Stark County, Ohio 44707.
- Verification of PCB Spill Cleanup by Sampling and Analysis*, U.S. Environmental Protection Agency Publication EPA-560/5-85-026, August 1985.
- Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup*, U.S. Environmental Protection Agency Publication EPA-560/5-86-017, May 1986.
- Wipe Sampling and Double Wash/Rinse Cleanup as Recommended by the Environmental Protection Agency PCB Spill Cleanup Policy*, June 23, 1987, revised and clarified on April 18, 1991.

APPENDIX A

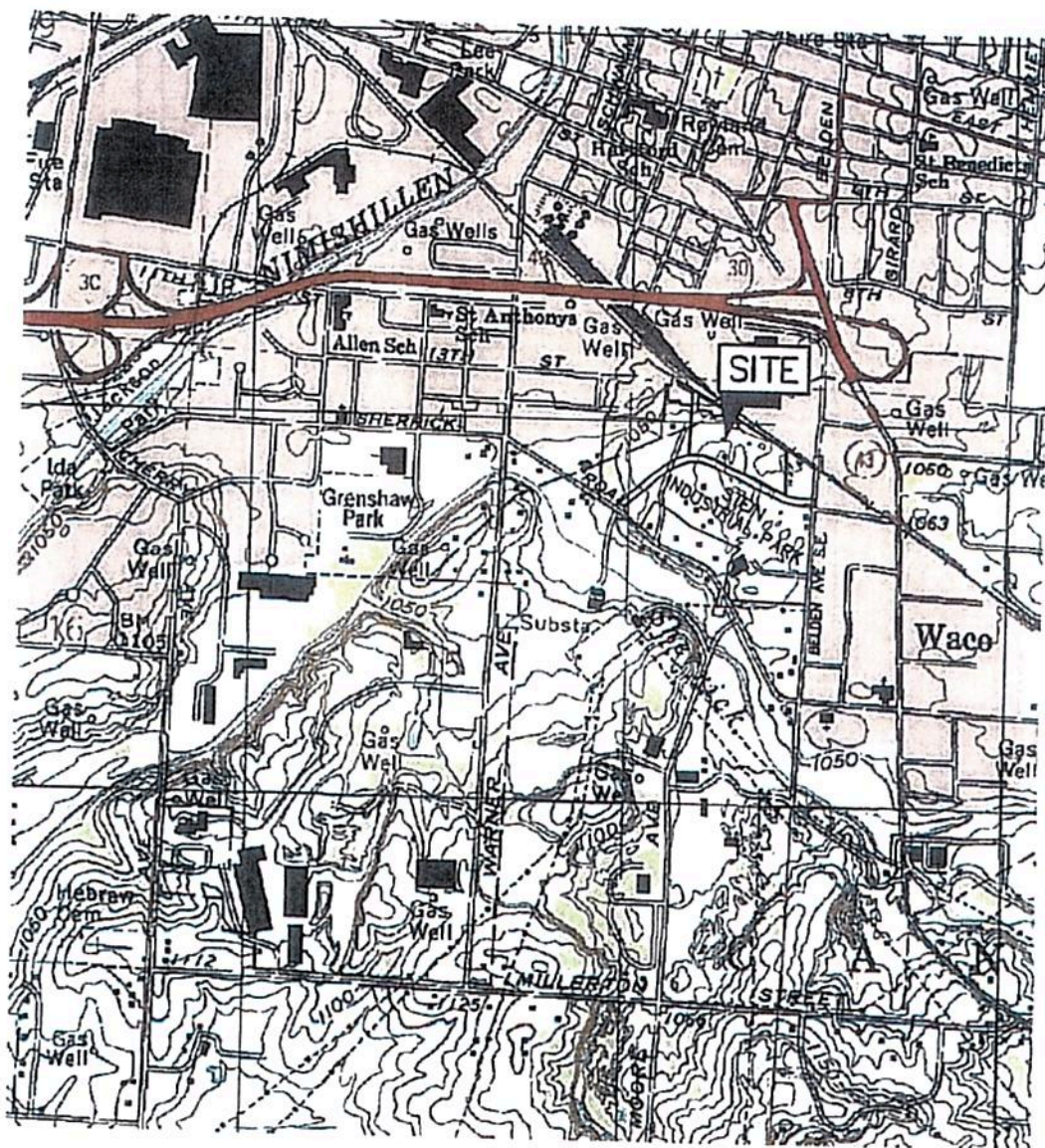
FIGURES

FIGURE 1
USGS Map
(Canton East Quadrangle)

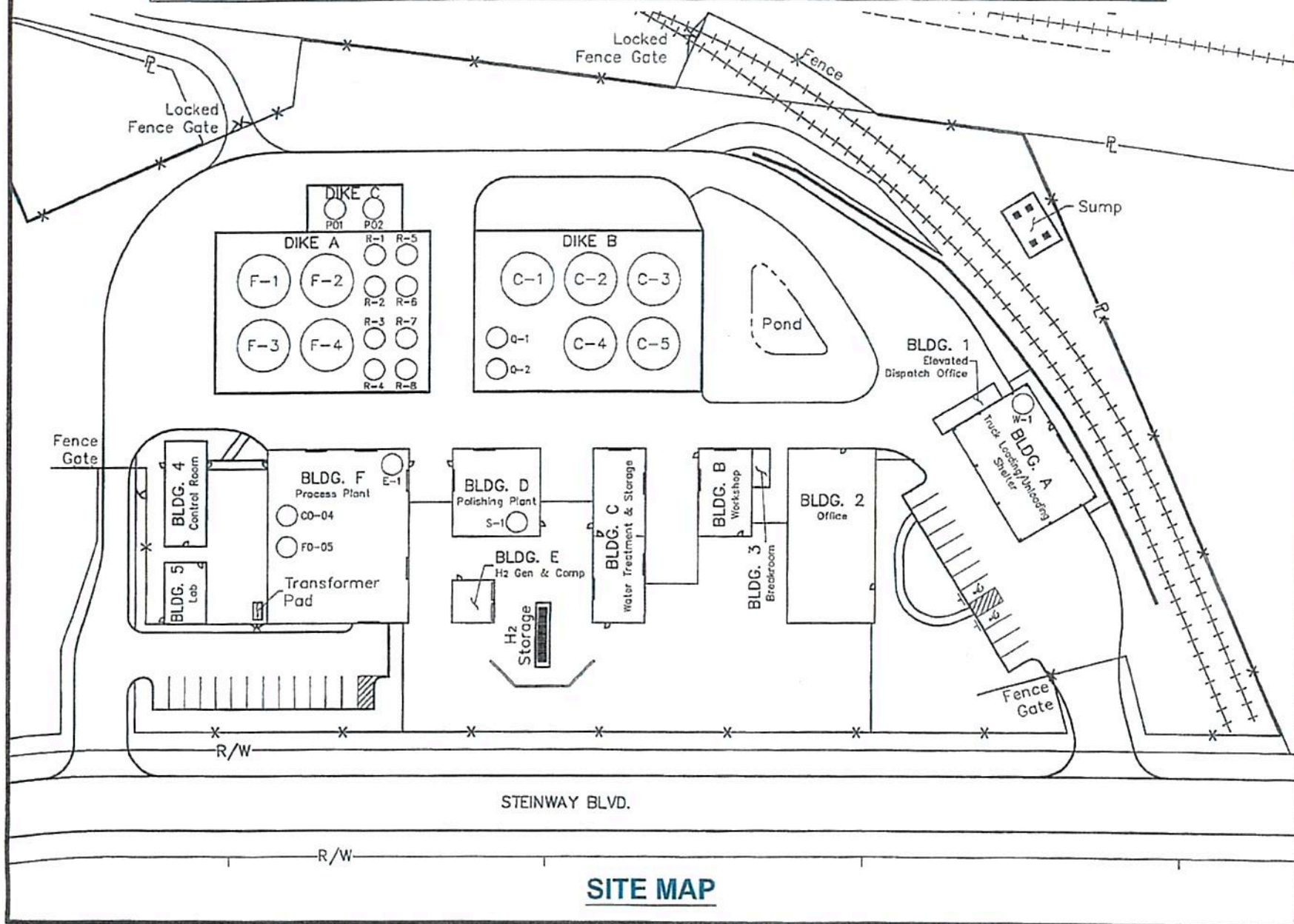


Site: Hydrodec, 8.4 Acres
Canton, Ohio

Scale: None



HYDRODEC NORTH AMERICA - CANTON, OHIO



SITE MAP

FIGURE 3
Facility Drainage Diagram



Site: Hydrodec, 8.4 Acres
Canton, Ohio

Scale: 1"=100'

LEGEND

- = Direction of drainage
- = Drainage divide
- • = Stm manhole/catch basin

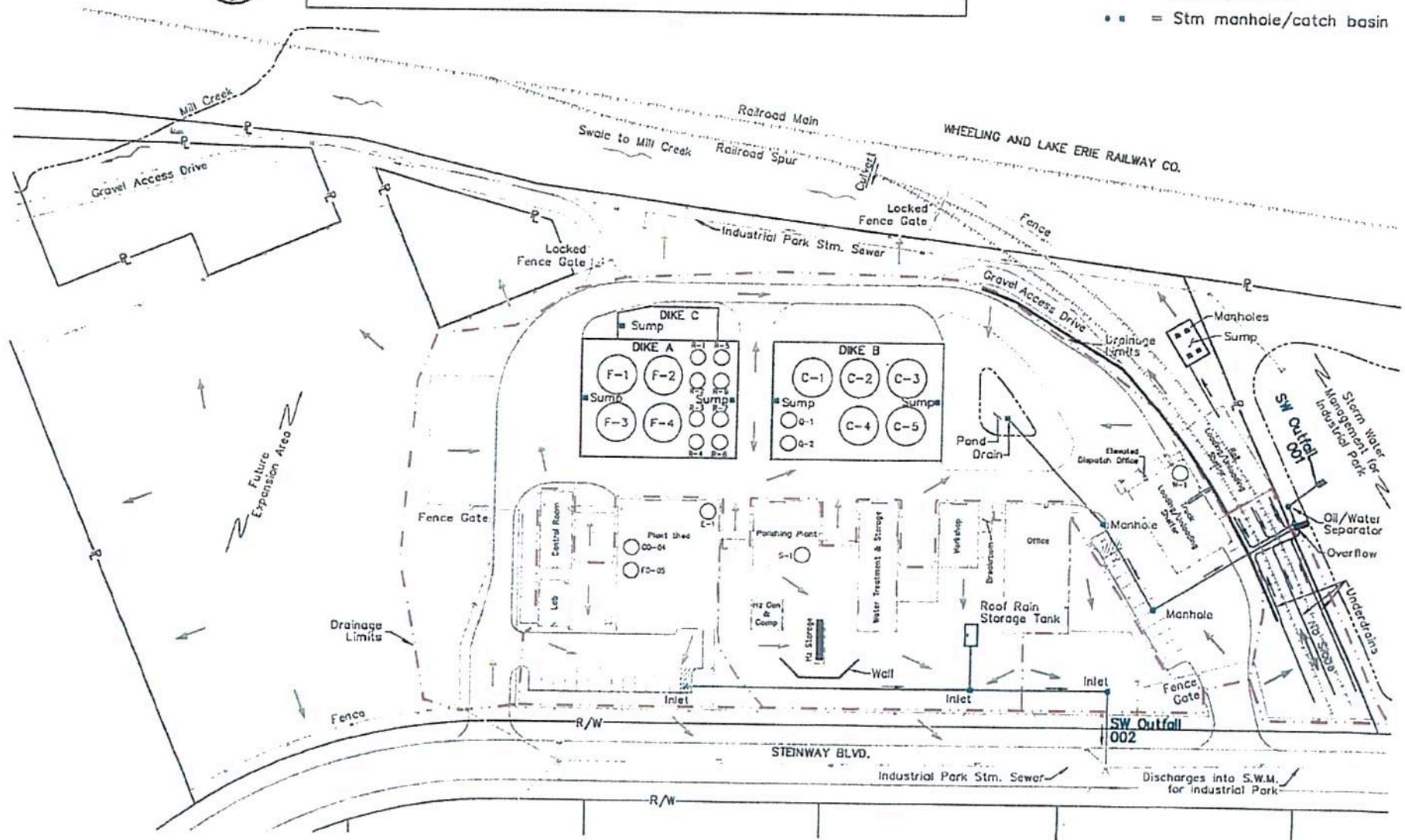


FIGURE 4

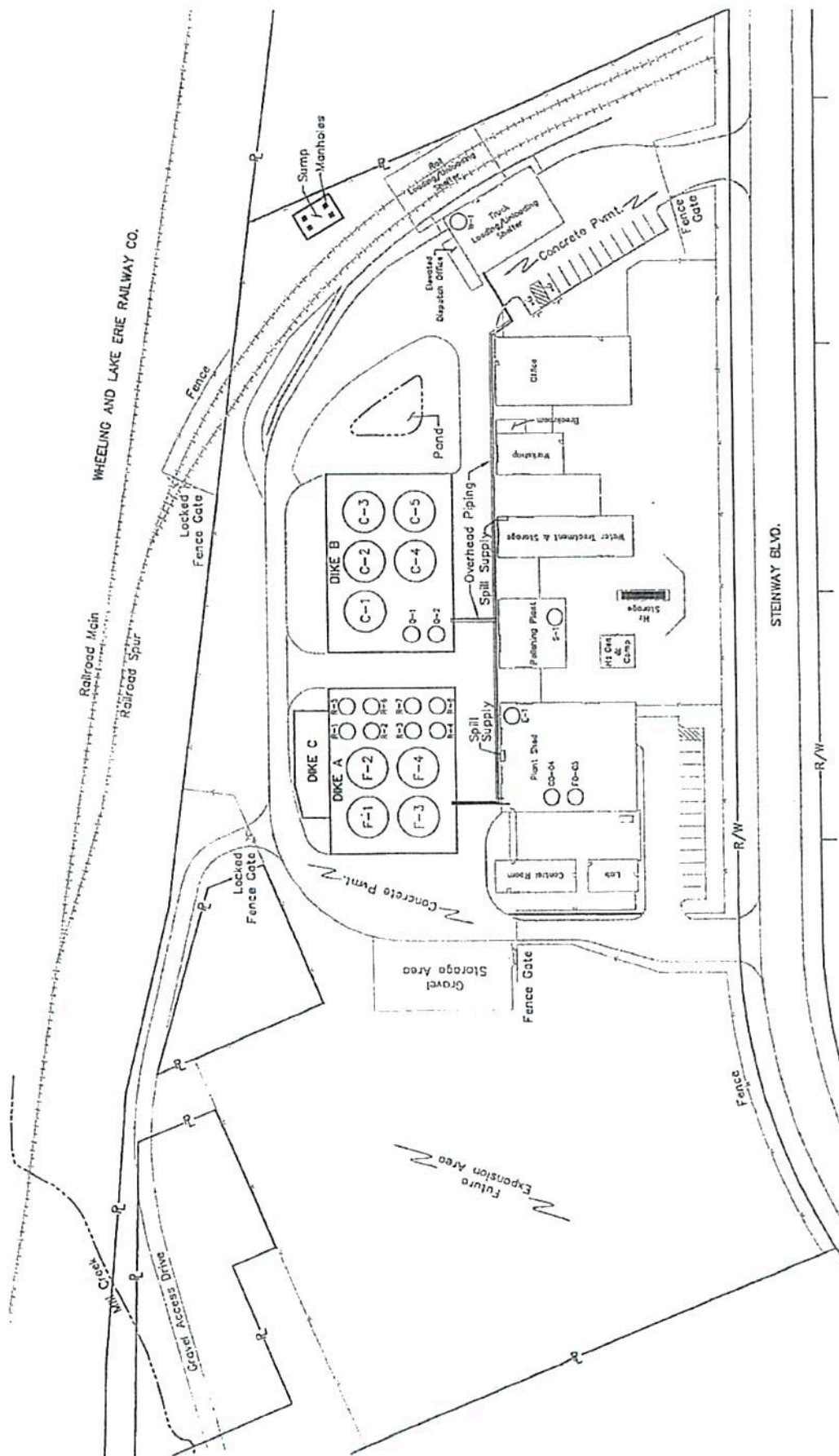
Facility Piping Diagram



Site:

Hydrodec, 8.4 Acres
Canton, Ohio

Scale: 1"=100'



APPENDIX B

APPLICABLE REGULATION

40 CFR 761—POLYCHLORINATED BIPHENYLS (PCBs) MANUFACTURING, PROCESSING, DISTRIBUTION IN COMMERCE, AND USE PROHIBITIONS

Subpart A—General

- § 761.1 Applicability.
- § 761.2 PCB concentration assumptions for use.
- § 761.3 Definitions.
- § 761.19 References.

Subpart B—Manufacturing, Processing, Distribution in Commerce, and Use of PCBs and PCB Items

- § 761.20 Prohibitions and exceptions.
- § 761.30 Authorizations.
- § 761.35 Storage for reuse.

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Subpart D—Storage and Disposal

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- § 761.60 Disposal requirements.
- § 761.61 PCB remediation waste.
- § 761.62 Disposal of PCB bulk product waste.
- § 761.63 PCB household waste storage and disposal.
- § 761.64 Disposal of wastes generated as a result of research and development activities authorized under § 761.30(j) and chemical analysis of PCBs.
- § 761.65 Storage for disposal.
- § 761.70 Incineration.
- § 761.71 High efficiency boilers.
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- § 761.75 Chemical waste landfills.
- § 761.77 Coordinated approval.
- § 761.79 Decontamination standards and procedures.

Subpart E—Exemptions

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Subpart F—Transboundary Shipments of PCBs for Disposal

- § 761.91 Applicability.
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- § 761.99 Other transboundary shipments.

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- § 761.120 Scope.
- § 761.123 Definitions.
- § 761.125 Requirements for PCB spill cleanup.
- § 761.130 Sampling requirements.
- § 761.135 Effect of compliance with this policy and enforcement.

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Subpart J—General Records and Reports

- § 761.180 Records and monitoring.
- § 761.185 Certification program and retention of records by importers and persons generating PCBs in excluded manufacturing processes.
- § 761.187 Reporting importers and by persons generating PCBs in excluded manufacturing processes.
- § 761.193 Maintenance of monitoring records by persons who import, manufacture, process, distribute in commerce, or use chemicals containing inadvertently generated PCBs.

Subpart K—PCB Waste Disposal Records and Reports

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- § 761.205 Notification of PCB waste activity (EPA Form 7710–53).
- § 761.207 The manifest—general requirements.
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Subpart M—Determining a PCB Concentration for Purposes of Abandonment or Disposal of Natural Gas Pipeline: Selecting Sample Sites, Collecting Surface Samples, and Analyzing Standard PCB Wipe Samples

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- § 761.340 Applicability.
- § 761.345 Form of the waste to be sampled.
- § 761.346 Three levels of sampling.
- § 761.347 First level sampling—waste from existing piles.
- § 761.348 Contemporaneous sampling.
- § 761.350 Subsampling from composite samples.
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- § 761.366 Cleanup equipment.
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- § 761.395 A validation study.
- § 761.398 Reporting and recordkeeping.



APPENDIX D

PCB CLOSURE PLAN COST ESTIMATE

PCB Closure Cost Estimate

Hydrodec North America, LLC

Canton, Ohio

Prepared For:

Hydrodec North America, LLC
2021 Steinway Blvd., SE
Canton, Ohio 44707

May 2010

HYDRODEC NORTH AMERICA, LLC
PCB CLOSURE COST ESTIMATE

PREPARED FOR:

HYDRODEC NORTH AMERICA, LLC
2021 STEINWAY BLVD., SE
CANTON, OHIO 44707

MAY 2010

PREPARED BY:

BURGESS & NIPLE, INC.
ENGINEERS • ENVIRONMENTAL SCIENTISTS • GEOLOGISTS
5085 REED ROAD
COLUMBUS, OHIO 43220

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1.0 INTRODUCTION

This Polychlorinated Biphenyls (PCB) Closure Cost Estimate estimates the cost of the procedures for closure of the PCB oil storage facilities at the Hydrodec North America, LLC (Hydrodec) facility in Canton, Ohio, as outlined in the PCB Closure Plan for the facility dated March 2010. The Hydrodec facility is applying for a permit to receive PCB oils from transformers and treat the oil such that it no longer contains PCBs. This Closure Cost Estimate is required as part of the permit process and follows the requirements of the U.S. Environmental Protection Agency's (EPA) Toxic Substances Control Act (TSCA) regulations in 40 Code of Federal Regulations (CFR) 761.65.

The PCB Closure Plan describes the procedures to be used to achieve clean closure of the Hydrodec facility. Clean closure will require the removal or decontamination of all PCB oils, wastes, waste residues, containers, construction materials, soils, or other materials containing or contaminated with PCBs to those levels specified in 40 CFR 761.61 and 761.79. Specifically, the closure will involve decontaminating or removing the PCB oil, tanks, piping, concrete, and steel structures, and if necessary, conducting sampling of soil beneath the PCB oil storage areas to verify no contamination has occurred.

2.0 FACILITY IDENTIFICATION

2.1 Facility Name

Hydrodec North America, LLC.

2.1.1 EPA Identification Number

OHR000143263 (Re-refiner of used oil).

2.1.2 Facility Address

2021 Steinway Blvd., SE
Canton, Ohio 44707.

2.2.3 Mailing Address

2021 Steinway Blvd., SE
Canton, Ohio 44707.

2.1.4 Contact Person

Brian Klink
General Manager
Office: 330-454-8202 ext. 102
Email: brian.klink@hydrodec.com.

2.1.5 Facility Operator

Hydrodec North America, LLC.

2.1.6 Owner

Hydrodec North America, LLC.

3.0 CLOSURE COST ESTIMATE

The purpose of this Closure Cost Estimate is to ensure that adequate funds along with a suitable financial mechanism will be available to pay for costs in the event that the permittee is unable or unwilling to complete closure. The estimated costs should be sufficient to enable a third party to assume and carry out the responsibilities of closure. A summary of the estimated cost of employing a third party to implement closure of the Hydrodec facility is presented in Table 1. The cost estimates were developed based on previous project experience, information provided by disposal facilities, and industry cost estimating manuals. The estimated costs are in current dollars. The cost estimate will be updated on an annual basis within 60 days of the anniversary date of the establishment of the financial instruments used to demonstrate financial responsibility for closure.

Currently, post-closure activities such as control and maintenance of the site are not required since the anticipated closure activities should achieve clean closure. Therefore, post closure activities are not included in this Closure Cost Estimate.

The costs for all major closure activities include: (1) planning and preparation; (2) decontamination of facility components; (3) packaging, shipment, and disposal of waste; (4) confirmation sampling.

3.1 Assumptions

Assumptions used in deriving the Closure Cost Estimate are as follows:

- The estimate is based on assumptions that there would be sufficient funds available to enable a third party (independent contractor) to assume and carry out the responsibilities for closing the Hydrodec facility in the event that the permittee is unable or unwilling to complete closure in a timely manner.
- Facility components will be closed by decontamination.
- Planning and preparation activities include documentation for regulatory agencies, and development of a work plan.

- Costs associated with restoration of outdoor areas and site stabilization are not included in this estimate.
- PCB oil storage tanks will be double rinsed with an appropriate solvent to remove PCB contamination.
- No soil sampling or excavation will be necessary.
- Level D Personal Protective Equipment (PPE) will be utilized during closure.
- PPE generated during closure activities will be disposed of with other non-liquid wastes. PPE includes tyvek coveralls, gloves, rubber boots, and respirators. For the cost estimate, it is assumed that 30 drums will be filled with PPE for disposal.

3.2 Closure Cost Analysis

A summary of estimates for closure of the PCB oil storage facility are shown in Table 1 and a more detailed spreadsheet is provided in **Appendix B**. Some of the main activity descriptions are provided below.

3.2.1 Planning and Preparation (Engineering Expenses)

Planning and preparation for closure includes activities to ensure that the closure effort is preformed in a safe and cost-effective manner in accordance with all applicable federal, state, and local regulations. Planning and preparation activities include development of the Closure Work Plan, detailed Sampling and Analysis Plan, procurement of special equipment (as needed), securing contracts for transportation and third party labor to perform the closure work. This cost is estimated as 10 percent of the closure costs, excluding certification of closure.

3.2.2 General Conditions

General conditions are the general items that will be necessary for completion of the project including PPE, labor, supervisor, insurance, temporary facilities, etc. This cost is estimated at 10 percent of the closure costs, excluding certification of closure.

3.2.3 Sampling and Analysis

Costs for sampling and analysis of samples collected to verify clean closure are based on the anticipated samples as described in Sections 8.0 and 9.0 of the PCB Closure Plan. Based on the design of the facility, soil and sediment contamination is not expected.

3.2.4 Disposal Costs

Clean closure is anticipated to be achieved for the equipment and concrete at the facility. Only wash water rinsate and PPE disposal is anticipated for the closure activities.

Table 1
Closure Cost Summary

Description	Quantity	Estimated Cost
Removal of waste	24,930 gallons	\$1,500
Decontamination		
• Flushing tanks, piping	18,568 gallons	\$1,100
• Steam cleaning/pressure wash	4,642 square feet (sf)	\$7,600
• Sandblasting/scarification	2,368 sf	\$9,000
• Decon heavy equipment	5 pumps, 2 hours	\$5,300
Sampling and analysis	54 soil, 75 wipe, 12 liquid, 18 chip	\$18,000
Transportation of waste	18,568 gallons	\$22,000
Waste disposal	12.15 tons; 18,568 gallons	\$136,500
Subtotal		\$201,000
Planning and Preparation (Engineering expenses)	10%	\$20,000
General Conditions	10%	\$20,000
Engineering Certification	1	\$36,000
Subtotal		\$277,000
Contingency	20%	\$55,500
Sales Tax	6.5%	\$21,600
TOTAL CLOSURE COST	-	\$354,100

4.0 REFERENCES

Means 1994 Building Construction Cost Data, Western Edition. R.S. Means Company, Inc., Kingston, MA. 1993.

State of Washington Department of Ecology, Closure Cost Estimating Tool, Version 1.3.

APPENDIX A

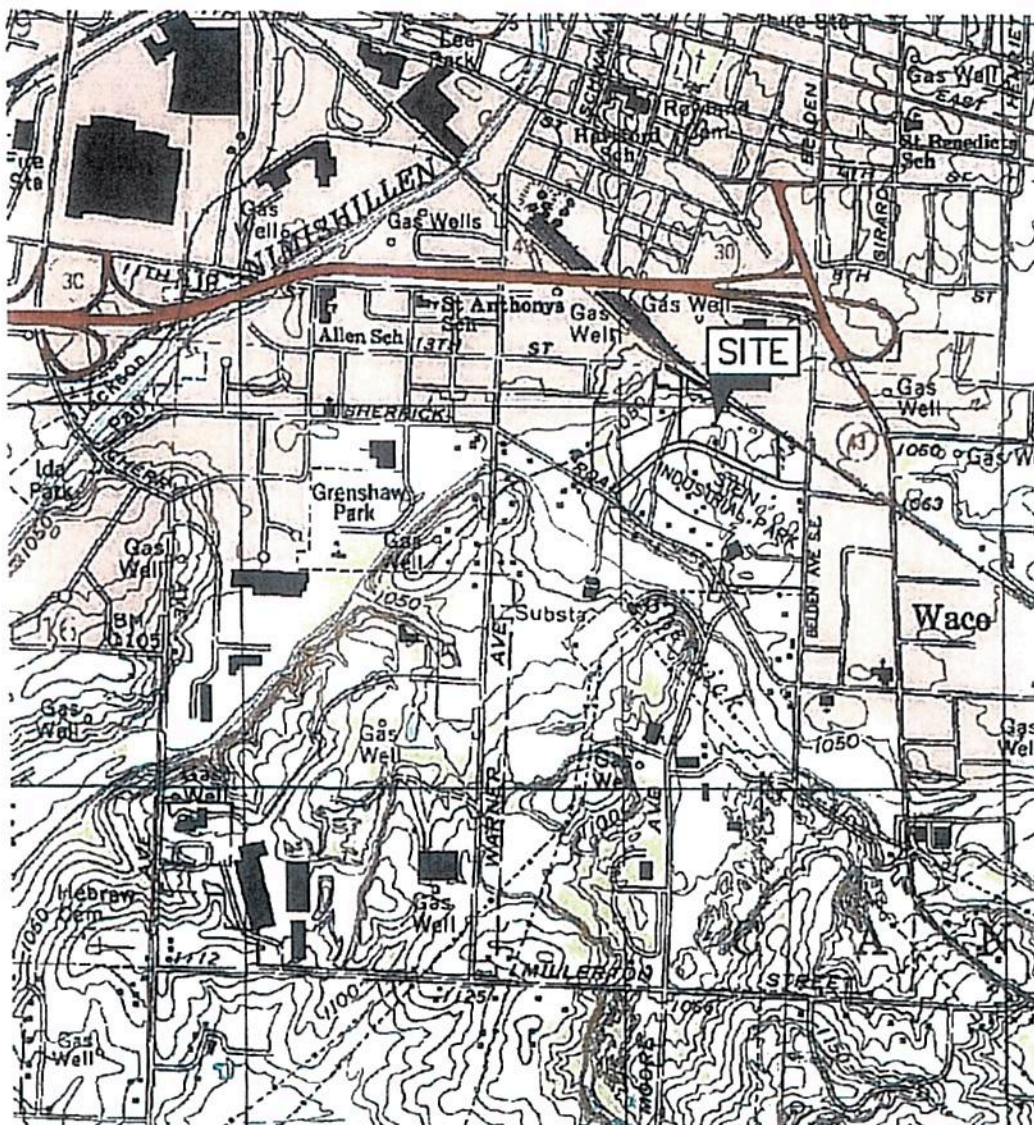
FIGURES

FIGURE 1
USGS Map
(Canton East Quadrangle)

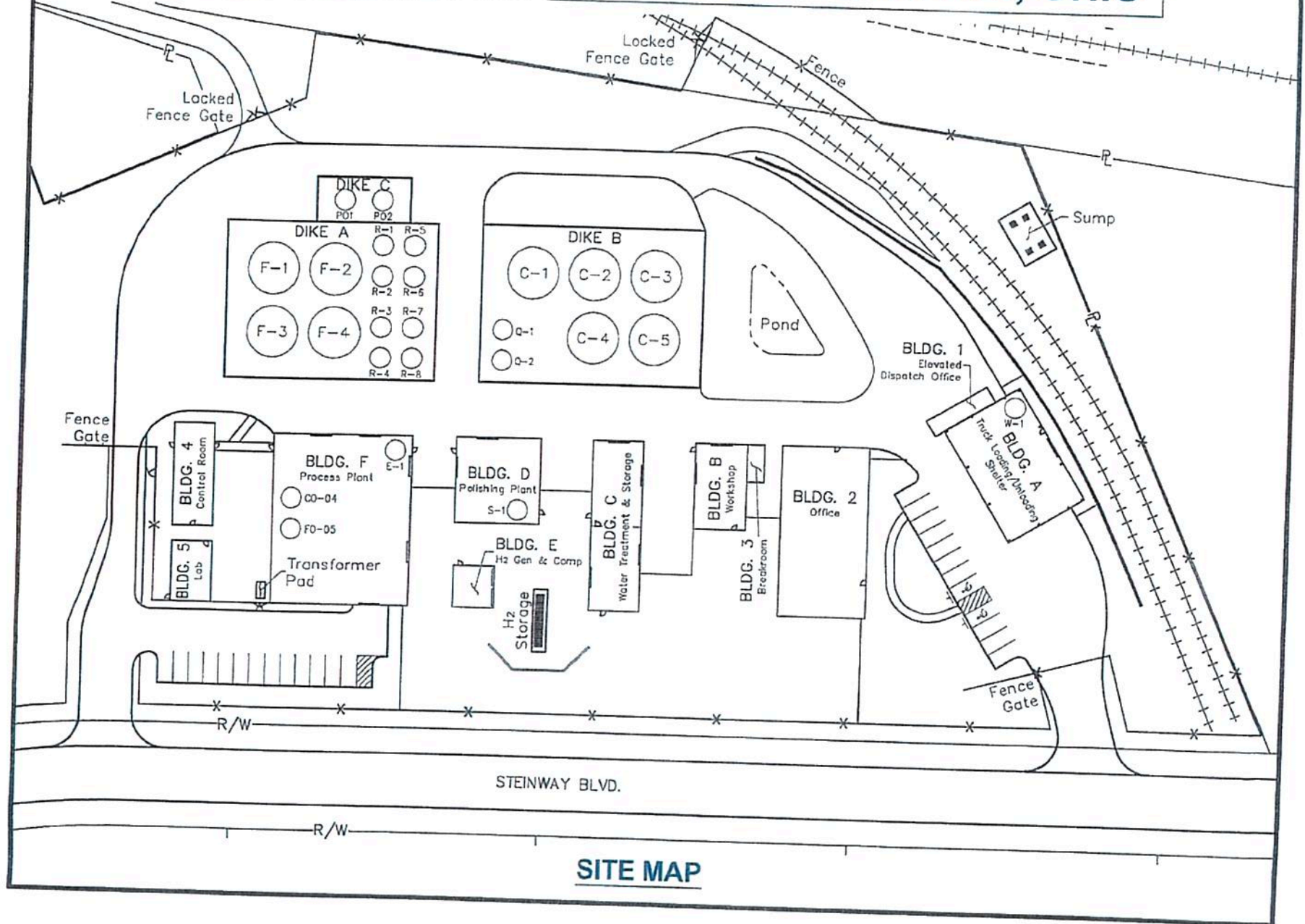


Site: Hydrodec, 8.4 Acres
Canton, Ohio

Scale: None



HYDRODEC NORTH AMERICA - CANTON, OHIO



SITE MAP

APPENDIX B

CLOSURE COST ESTIMATE SPREADSHEET

Facility Identification Information

Facility Information

Facility Name:	Hydrodec North America, LLC
Address1:	2021 Steinway Blvd, SE
Address2:	
City	Canton
State	Ohio
Zip	44707
Please enter first 3 digits of zip code to generate localization code	447

Closure Cost Estimate Creator Contact Information

Name:	Jennifer Conroy
Address1:	Burgess & Niple
Address2:	5085 Reed Road
City	Columbus
State	Ohio
Zip	43220
Telephone:	614-459-2050
Fax:	614-451-1385
Email:	jconroy@burnip.com

Closure Activity Questions

Does your facility store waste in containers?	no
Does your facility store waste in tanks?	yes
Does your facility have a secondary containment system?	yes
Will your facility need to do any sampling and analysis to perform or verify closure?	yes
As part of closure, will you have to remove or decontaminate heavy equipment?	yes
As part of closure, will you have to remove or demolish buildings or other structures?	no
As part of closure, will you have to remove or decontaminate soil?	no
As part of closure, will you use steam cleaning or pressure washing?	yes
As part of closure, will you use sandblasting or scarification?	no
As part of closure, will you need to transport waste?	yes
As part of closure, will you need to treat/dispose of waste?	yes
As part of closure, will you need to decontaminate/dispose of a containment system?	yes

FACILITY SUMMARY

	Unit	Worksheet Reference	Cost to Close
1	Container Storage Areas	<u>CS-1</u>	0.00
2	Tank Systems	<u>TS-1</u>	332,125.46
3	User Defined Costs	<u>UD-1</u>	0.00
	Subtotal		332,125.46
	Enter Sales Tax (%)		6.5
	Sales Tax		21,588.15
	Total Closure Costs Estimate		353,713.61

**TS-1:TANK SYSTEMS
SUMMARY WORKSHEET**

Check boxes below to activate sheets		Some of the activities listed below are conducted routinely as part of closure of tank systems. The owner or operator, however, might intend or be required to conduct additional activities to effect closure at the unit. Worksheets for estimating the costs of such additional activities are listed in italic type.	Worksheet Number	Cost	
<input checked="" type="checkbox"/>	1	Removal of Waste	TS-3	1,475.66	\$
<input type="checkbox"/>	2	<i>Tank System Purging (ignitable wastes only)</i>	TS-4	0.00	\$
<input checked="" type="checkbox"/>	3	<i>Flushing the Tank and Piping</i>	TS-5	1,099.05	\$
<input type="checkbox"/>	4	<i>Disassembly and Loading</i>	TS-6	0.00	\$
<input type="checkbox"/>	5	<i>Demolition and Removal of Containment System</i>	TS-7	0.00	\$
<input type="checkbox"/>	6	<i>Removal of Soil</i>	TS-8	0.00	\$
<input type="checkbox"/>	7	<i>Backfill</i>	TS-9	0.00	\$
<input checked="" type="checkbox"/>	8	Decontamination	TS-10	21,850.26	\$
<input checked="" type="checkbox"/>	9	Sampling and Analysis	TS-11	17,662.02	\$
<input checked="" type="checkbox"/>	10	Transportation	TS-12	22,000.00	\$
<input checked="" type="checkbox"/>	11	Treatment and Disposal	TS-13	136,467.61	\$
	12	Subtotal of Closure Costs (Add lines 1 through 11)		200,554.59	\$
	13	Engineering Expenses (approximately 10% of closure costs, excluding certification of closure [Multiply line 12 by 0.10])		20,055.46	\$
	14	General Conditions (incl. personal protective equipment, labor supervision, insurance, temporary facilities, etc.) Approximately 10% of closure costs, excluding certification of closure. [multiply line 12 by 0.10]		20,055.46	
	15	Certification of Closure	TS-14	36,105.71	\$
	16	Subtotal (add engineering expenses and costs of certification of closure to closure costs) (Add lines 12, 13,14 and 15)		276,771.22	\$
	17	Contingency Allowance (approximately 20% of closure costs, engineering expenses, and costs of certification of closure) (Multiply line 16 by 0.20)		55,354.24	\$
		TANK SYSTEMS:		332,125.46	\$
		TOTAL COST OF CLOSURE (add lines 15 and 16)			

TS-2:TANK SYSTEMS INVENTORY

If the design characteristics of the tank system to be evaluated do not conform to the format of the worksheet below, alternative calculations may be used to determine accurately the surface areas of all structures to be decontaminated and demolished, and the volumes of all structures, soils, and materials to be removed. Depending on the activities to be conducted to effect closure of the unit, it may not be necessary to complete all sections of this inventory worksheet.

UNIT DESCRIPTION AND MAXIMUM CAPACITY				
Describe the unit to determine the cost of the activities to be conducted to close				
1 A	Type of tank system (aboveground or on-ground) b	above ground		
1 B	Maximum capacity of all tanks subject to closure	24,600.00	gal	
1 C	Total length of ancillary piping	500.00	ft	
1 D	Maximum capacity of ancillary piping (Refer to the table at the bottom of this worksheet for guidance on estimating the capacity of ancillary piping)	330.50	gal	
1 E	Maximum capacity of tank and ancillary piping (Add lines 1 B and 1 D)	24,930.50	gal	
1 F	Type of secondary containment system	Vault Lined containment system (external to tank)		
If 1 F is Other Explain				
2 INTERIOR SURFACE AREA OF TANK SYSTEMS				
Determine the interior surface area of all tank systems subject to closure to determine costs of decontamination				
2 A	Interior surface area of tank (Refer to the table at the bottom of this worksheet for guidance on estimating the interior surface area of a tank)	1,791.00	ft ²	
2 B	Ancillary piping (Refer to Page 5 of 5 of this worksheet for guidance on estimating the interior surface area of ancillary piping)	530.00	ft ²	
2 C	Surface Area of Tank Systems (Add lines 2 A and 2 B)	2,321.00	ft ²	
2 D	Surface Area of Tank Systems in yd ² (Divide line 2 C by 9)	257.89	yd ²	
3 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM PAD				
Determine the surface area of the secondary containment system pad to calculate costs for decontaminating or demolishing the pad at the time of closure				
3 A	Length	44.00	ft	
3 B	Width	25.00	ft	
3 C	Surface Area of Secondary Containment System Pad (Multiply line 3 A by line 3 B)	1,100.00	ft ²	
3 D	Surface Area of Secondary Containment System Pad in yd ² (Divide line 3 C by 9)	122.22	yd ²	
4 VOLUME OF SECONDARY CONTAINMENT SYSTEM PAD				
Calculate the volume of the secondary containment system pad to determine the cost of removing the pad. Removal of the secondary containment system pad is an activity that might be conducted at the time of closure.				
4 A	Thickness	0.00	ft	
4 B	Thickness in yards (Divide line 4 A by 3)	0.00	yd	
4 C	Volume of Secondary Containment System Pad in yd ³ (Multiply line 3 D by line 4 B)	0.00	yd ³	
5 SURFACE AREA OF SECONDARY CONTAINMENT SYSTEM BERM				
Calculate the interior surface area of the secondary containment system berm, or curbing, to determine the cost of decontaminating and demolishing the berm at the time of closure.				
5 A	Length	317.00	ft	
5 B	Height	4.00	ft	
5 C	Surface Area of Secondary Containment System Berm (Multiply line 5 A by line 5 B)	1,268.00	ft ²	
5 D	Surface Area of Secondary Containment System Berm in yd ² (Divide line 5 C by 9)	140.89	yd ²	
6 VOLUME OF SECONDARY CONTAINMENT SYSTEM BERM				
Calculate the volume of the secondary containment system berm, or curbing, to determine the cost of removing the berm. Removal of the secondary containment system berm is an activity that might be conducted at the time of closure.				
6 A	Thickness	0.00	ft	
6 B	Thickness in yards (Divide line 6 A by 3)	0.00	yd	
6 C	Volume of Secondary Containment System Berm in yd ³ (Multiply line 5 D by line 6 B)	0.00	yd ³	
7.A SURFACE AREA OF OTHER STRUCTURES IN SECONDARY CONTAINMENT SYSTEM (specify by name)				
Calculate the surface area of all additional structures that are part of the secondary containment system at the unit that will be decontaminated or demolished at the time of closure (for example, load/unload pads, ramps or sumps).				
1	Surface Area of Other Structures	0.00	ft ²	
Specify name of Area				
2	Surface Area of Other Structures in yd ² (Divide line 7 A by 9)	0.00	yd ²	
8.A VOLUME OF OTHER STRUCTURES IN SECONDARY CONTAINMENT SYSTEM				
Calculate the volume of all additional structures that are part of the secondary containment system at the unit to determine costs of removing those structures. Removal of other structures is an activity that might be conducted at the time of closure.				
1	Volume of Other Structures	0.00	yd ³	
7.B SURFACE AREA OF OTHER STRUCTURES IN SECONDARY CONTAINMENT SYSTEM (specify by name)				
Calculate the surface area of all additional structures that are part of the secondary containment system at the unit that will be decontaminated or demolished at the time of closure (for example, load/unload pads, ramps or sumps).				
1	Surface Area of Other Structures	0.00	ft ²	
Specify name of Area				
2	Surface Area of Other Structures in yd ² (Divide line 7 A by 9)	0.00	yd ²	
8.B VOLUME OF OTHER STRUCTURES IN SECONDARY CONTAINMENT SYSTEM				
Calculate the volume of all additional structures that are part of the secondary containment system at the unit to determine costs of removing those structures. Removal of other structures is an activity that might be conducted at the time of closure.				
1	Volume of Other Structures	0.00	yd ³	

9 VOLUME OF CONTAMINATED SOIL TO BE REMOVED			
Calculate the volume of contaminated soil to be removed. Removal of contaminated soil is an activity that might be conducted at the time of closure.			
9 A	Length	0.00	ft
	Width	0.00	ft
	Depth	0.00	ft
Volume of Contaminated Soil to be Removed (Multiply line 9 A by line 9 B by line 9 C)		0.00	ft ³
9 E	Volume of Contaminated Soil to be Removed in yd ³ (Divide line 9 D by 27)	0.00	yd ³

Notes

- a For example, if a secondary containment system pad is circular in shape rather than rectangular, the user would be unable to calculate the surface area of that pad using the method prescribed in section 2 of this inventory worksheet. Rather, the surface area of such a pad could be calculated using the equation πr^2 .
- b Owners and operators of in-ground and underground storage tanks are not eligible to use standardized permits.

Interior Surface Areas of Tanks of Various Capacities Reference for Line 2.A.

FOR CONICAL TANKS OR CALCULATIONS NOT LISTED BELOW, USE THE "SURFACE AREA CALCULATOR" ON ECOLOGY'S WEB SITE AT:

http://www.ecy.wa.gov/programs/hwtr/hwtfacilities/Surface_Area_Calculations.xls

Click on the box above and select "copy". Then open your browser and paste the address in your address bar.

Capacity (gal)	Approximate Diameter (ft)	Approximate Height or Length (ft)	Surface Area (ft ²)
DIMENSIONS OF VERTICAL TANKS			
5,000	9	10.50	424.00
10,000	11.5	13.00	677.00
15,000	13	15.00	878.00
20,000	15	15.00	1,060.00
25,000	16	17.00	1,257.00
30,000	17	18.00	1,415.00
DIMENSIONS OF HORIZONTAL TANKS			
5,000	6	23.00	490.00
10,000	8	26.00	754.00
*5,000	9.5	29.00	1,007.00
1,000	10	34.00	1,225.00
25,000	10.5	38.00	1,427.00
30,000	11	42.00	1,641.00

Standard Equations for Calculation the Interior Surface Areas of Tanks Reference for Line 2.A

Shape	Equation
Cylinder	$2\pi rh$
Circle	πr^2
Cone	$\pi r^2 \sqrt{r^2 + h^2}$

r = radius
h = height

Properties of Standard Wall Steel Pipe a Reference for Lines 1.C and 2.B

Nominal Size (inches)	Inside Diameter (inches)	Inside Volume (gal/ft) b	Inside Surface Area (ft ² /ft) 2 c
0.75	0.82	0.03	0.22
1	1.05	0.04	0.27
1.25	1.38	0.08	0.36
1.5	1.61	0.11	0.42
2	2.07	0.17	0.54
2.5	2.47	0.25	0.65
3	3.07	0.38	0.80
4	4.03	0.66	1.06
6	6.07	1.50	1.59
8	7.98	2.59	2.09
10	10.02	4.09	2.62
12	12.09	5.95	3.17
14	13.25	7.17	3.46
16	15.25	9.48	3.99
18	17.25	12.09	4.52
20	19.25	15.19	5.04
24	23.25	22.13	6.08

Notes

- a Modified from Carrier Air Conditioning Company, Inc., Carrier System Design Manual, 1973, Chapter 1, page 3-2
- b Gallons per linear foot of straight pipe
- c Square feet per linear foot of straight pipe

**TS-3:TANK SYSTEM
REMOVAL OF WASTE**

1	Maximum volume of waste to be removed from the tank and ancillary piping (Enter from worksheet TS-2, line 1.E)	24,930.50	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) <i>a</i>	D	level of PPE	
3	Labor and equipment cost per work hour <i>b</i>	179.37	\$	
4	Work rate required to remove waste from tank and ancillary piping <i>c</i>	0.000330	work hr/gal	
5	Number of hours required to remove waste from tank and ancillary piping (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	8.23	work hrs	
UD			\$	
TOTAL COST OF REMOVAL OF WASTE FROM TANK AND ANCILLARY PIPING (Multiply line 3 by line 5) (Enter total on Worksheet TS-1, line 1)			1,475.66	\$

Notes:

a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.

b The estimated cost per work hour of all labor and equipment needed to remove waste for the unit.

c The estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste for the system, a work rate of 0.017 (1 divided by 60) for removing the waste is calculated.

TS-5:TANK SYSTEMS
FLUSHING THE TANK AND PIPING

Complete this worksheet only for tank systems that will be flushed.

1	Maximum capacity of the tank and ancillary piping (Multiply Worksheet TS-2, line 2.C by 4)	9,284.00	gal	If you are not going to flush all tanks, enter the reason here
2	Number of times tank and ancillary piping will be flushed (if unknown, assume 1)	2		
3	Total volume of flushing solution (Multiply line 1 by line 2)	18,568.00	gal	
4	Level of PPE assumed for this activity (protection level D, C, or B) <i>a</i>	D	level of PPE	
5	Labor and equipment cost per work hour <i>b</i>	179.37	\$	
6	Work rate required to flush tank and ancillary piping <i>c</i>	0.000330	work hr/gal	
7	Number of hours required to flush tank and ancillary piping (Multiply line 3 by line 6) (One hour minimum; round up to the half-hour)	6.13	work hrs	
8	Subtotal of labor and equipment costs to flush tank and ancillary piping (Multiply line 5 by line 7)	1,099.05	\$	
9	Total volume of flushing solution (Enter from line 3). (The flushing solution generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B (for water-based flushing solution) or TS-12 and TS-13A (for a solvent solution) to calculate the transportation, treatment, and disposal cost. If the flushing solution is to be placed in drums, complete lines 10 through 12.)	18,568.00	gal	
	Check this box if you plan on disposing of the flushing solution as bulk liquid	<input checked="" type="checkbox"/>	If you check this box, calculate the treatment and disposal costs in Sheet TS-13B	
10	Number of drums required to contain flushing solution (Divide line 9 by 55 gallons per drum; round up to the nearest whole number)	338.00	drums	
11	Cost of one drum	263.50	\$/drum	
12	Cost of drums needed to contain flushing solution (Multiply line 10 by line 11)	0.00	\$	
UD			\$	
TOTAL COST OF FLUSHING OF TANK AND ANCILLARY PIPING (Add lines 8 and 12) (Enter total on Worksheet TS-1, line 3)		1,099.05	\$	

Remember to calculate costs for transporting, treating, and disposing of the wastes in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If the wastes are to be managed as a bulk liquid, use worksheet TS-13B.

Notes:

- a* Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b* The estimated cost per work hour of all labor and equipment needed to remove waste for the unit.
- c* The estimated number of hours required to remove one gallon of waste from the tank system. If, for example, it will take 1 minute to remove each gallon of waste for the system, a work rate of 0.017 (1 divided by 60) for removing the waste is calculated.

**TS-10:TANK SYSTEM
DECONTAMINATION SUMMARY**

Check
boxes
below to
activate
sheet

DECONTAMINATION SUMMARY WORKSHEET				
	Activity	Worksheet Numbers	Cost (\$)	
<input checked="" type="checkbox"/>	1 Decontamination of Unit by Steam Cleaning or Pressure Washing	TS-10A	7,566.16	\$
<input checked="" type="checkbox"/>	2 Decontamination of Unit by Sandblasting/Scarification	TS-10B	9,003.12	\$
<input checked="" type="checkbox"/>	3 Decontamination of Heavy Equipment	TS-10C	5,280.97	\$
TOTAL COST OF DECONTAMINATION (Add lines 1, 2, and 3) (Enter total on Worksheet TS-1, line 8)			21,850.26	\$

TS-10A:TANK SYSTEM
DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING

1	Area of unit to be decontaminated (Enter from Worksheet TS-2, add lines 2 C, 3 C, 5 C, and 7 A 1 and 7 B 2)	4,642.00	ft ²	If you are not going to pressure wash/steam clean all structures, enter the surface area of the structure(s) you are going to pressure wash/steam clean. Ensure all other containment structures are included on other sheets in this program.
2	Level of PPE assumed for this activity (protection level D, C, or B) <i>a</i>	D	level of PPE	
3	Labor and equipment cost per work hour <i>b</i>	60.37	\$	
4	Work rate to steam clean or pressure wash one ft ² <i>c</i>	0.03	work hrs/ft ²	
5	Number of hours required to steam clean or pressure wash the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	125.33	work hrs	
6	Subtotal of labor and equipment cost to decontaminate the unit by steam cleaning or pressure washing (Multiply line 3 by line 5)	7,566.16	\$	
7	Volume of decontamination fluid (Multiply line 1 by 4 gal/ft ³) (The decontamination fluids 2d generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the costs)	18,568.00	gal	
	Check this box if you plan on disposing of the decontamination solution as bulk liquid	<input checked="" type="checkbox"/>	If you check this box, the treatment and disposal costs should be calculated in Sheet TS-13B	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum; round up to the nearest whole number)	337.60	drums	
9	Cost of one drum	263.50	\$ /drum	
10	Cost of drums needed to contain decontamination fluid (Multiply line 8 by line 9)	0.00	\$	
UD			\$	
TOTAL COST OF DECONTAMINATION OF UNIT BY STEAM CLEANING OR PRESSURE WASHING (For bulk liquids, enter from line 6. For liquids in drums, add lines 6 and 10.) (Enter total on Worksheet TS-10, line 1)			7,566.16	\$

Remember to calculate costs for transporting, treating, and disposing of all decontam in drums that are generated from this activity, using worksheets TS-12 and TS-13A, respectively. If decontamination fluids are to be managed as a bulk liquid, use Worksheet TS-13B.

Notes:

a

Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, a requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.

b

The estimated cost per work hour of all labor and equipment needed to decontaminate the unit by steam cleaning or pressure washing.

c

The estimated number of work hours required to steam clean or pressure wash one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to steam clean or pressure wash one ft² of surface area, a work rate of 0.167 (10 divided by 60) for steam cleaning or pressure washing the unit is calculated.

d

U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), November 1986, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative generation rates also may be used, if appropriate.

TS-10B:TANK SYSTEMS
DECONTAMINATION OF UNIT BY SANDBLASTING/SCARIFICATION

1	Area of unit to be decontaminated (Enter from Worksheet TS-2; add lines 2 C, 3 C, 5 C, and 7 A.1 and 7 B.1)	2,368.00	ft ²	If you are not going to sandblast/scarify all structures, enter the surface area of the structure(s) you are going to sandblast/scarify. Ensure all other containment structures are included on other sheets in this program.
2	Level of PPE assumed for this activity (protection level D, C, or B) <u>a</u>	D	level of PPE	
3	Labor and equipment cost per work hour <u>b</u>	102.52	\$	
4	Work rate to sandblast one ft ² <u>c</u>	0.04	work hrs/ft ²	
5	Number of hours required to sandblast/scarify the unit (Multiply line 1 by line 4) (One hour minimum; round up to the half-hour)	85.25	work hrs	
6	Subtotal of labor and equipment cost to decontaminate unit by sandblasting/scarification (Multiply line 3 by line 5)	8,739.62	\$	
7	Volume of cement dust generated (Multiply line 1 by 0.6 cm and convert to gallons)	349.14	gal	
8	Number of drums required to contain decontamination sands for removal (Divide line 7 by 808.89 lbs per drum, round up to the nearest whole number) <u>e</u>	1.00	drums	
9	Cost of one drum	263.50	\$ /drum	
10	Cost of drums needed to contain decontamination sands (Multiply line 8 by line 9)	263.50	\$	
UD			\$	
TOTAL COST OF DECONTAMINATION OF UNIT BY SANDBLASTING/SCARIFICATION (Add lines 6 and 10) (Enter total on Worksheet TS-10, line 2)			9,003.12	\$

Notes:

- a** Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b** The estimated cost per work hour of all labor and equipment needed to decontaminate the unit by sandblasting/scarification
- c** The estimated number of work hours required to sandblast/scarify one ft² of surface area. If, for example, it is estimated that it will take 10 minutes to sandblast/scarify one ft of surface area, a work rate of 0.167 (10 divided 2 by 60) for sandblasting/scarifying the unit is calculated.
- d** U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), January 1987, EPA/530-SW-87-009, Volume III, pg. 5-3. The generation rate provided is recommended for this activity. However, alternative rates may be used, as appropriate. U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure.
- e** Unit weight of medium sand, on average, equals 110 lbs/ft³. Using the conversions of 0.1337 ft³/gal and 55-gal/drum, the calculation is: 110 lbs/ft³ x 0.1337 ft³/gal x 55 gal/drum = 808.89 lb/drum.

TS-10C:TANK SYSTEMS
DECONTAMINATION OF HEAVY EQUIPMENT

1	Number of hours needed to decontaminate all heavy equipment used during closure of the unit (Enter from table at bottom of this worksheet)	2	work hrs	
Enter types and number of Heavy Equipment being decontaminated				
5 Pumps				
2	Cost of rental of steam cleaner per hour	9.58	\$ /hr	
3	Subtotal rental costs for steam cleaner (Multiply line 1 by line 2)	19.1675	\$	
4	Level of PPE assumed for this activity (protection level D, C, or B) a	D	level of PPE	
5	Labor cost per work hour b	53.90	\$	
6	Subtotal of labor costs (Multiply line 1 by line 5)	107.8	\$	
7	Volume of decontamination fluid (Multiply line 1 by 100 gallons per hour) (The decontamination fluids generated may be disposed of in drums or as bulk liquid. If the volume is too large to be handled effectively by placement in drums, use worksheet TS-13B to calculate the cost of transportation and disposal. If the decontamination fluids are to be placed in drums, complete lines 8 through 10)	200.00	gal	
8	Number of drums required to contain decontamination fluid for removal (Divide line 7 by 55 gallons per drum and round up to the nearest whole number)	4	drums	
9	Cost of one drum	263.50	\$ /drum	
	Check this box if you plan on disposing of the decontamination solution as bulk liquid	<input type="checkbox"/>	If you check this box, the treatment and disposal costs should be calculated in Sheet TS-13B	
10	Cost of drums (Multiply line 8 by line 9)	1,054.00	\$	
11	Cost of construction of temporary decontamination area for heavy equipment. Only include this cost if no permanent decontamination area exists (otherwise, enter 0). NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS. THIS IS AN ASSUMED COST. IF YOU KNOW AN EXACT COST FOR THIS ITEM, ENTER IT INSTEAD.	2,750.00	\$	
12	Cost of demolition of temporary decontamination area for heavy equipment. Include this cost if no permanent decontamination area exists (otherwise, enter 0). NOTE: USUALLY THIS COST WILL BE INCURRED ONLY ONCE FOR THE CLOSURE OF ALL UNITS. THIS IS AN ASSUMED COST. IF YOU KNOW AN EXACT COST FOR THIS ITEM, ENTER IT INSTEAD.	1,350.00	\$	
UD			\$	
TOTAL COST OF DECONTAMINATION OF HEAVY EQUIPMENT (Add lines 3, 6, 10, 11, and 12) (Enter total on worksheet TS-10, line 3)		5,280.97	\$	

Decontamination Times for Heavy Equipment a Reference for Line 1

Equipment	Decontamination Time (Hours)
Forklift	1
Rotary disc	1
Tractor	2
Tank wagon	2
Front-end loader	3
Dozer	3
Backhoe	3
Front shovel	3

Notes:

- a U.S. Environmental Protection Agency. Final Guidance Manual: Cost Estimates for Closure and Post-Closure a Plans (Subparts G and H). January 1987. EPA/530-SW-87-009. Volume III, pg. 5-2. Decontamination times provided for specific pieces of equipment are recommended for this activity. However, alternative times also may be used, as appropriate.

TS-11:TANK SYSTEM
SAMPLING AND ANALYSIS SUMMARY SHEET

Check boxes below to activate sheet	SAMPLING AND ANALYSIS SUMMARY WORKSHEET		
	Activity	Number Worksheet	Cost (\$)
<input checked="" type="checkbox"/>	1. Drilling and Subsurface Soil Sampling & Analysis	TS-11B	5,849.78
<input checked="" type="checkbox"/>	2. Concrete Core Sampling & Analysis	TS-11C	0.00
<input checked="" type="checkbox"/>	3. Wipe Sampling & Analysis	TS-11D	8,437.31
<input checked="" type="checkbox"/>	4. Surface Water/Liquid Sampling & Analysis	TS-11E	1,349.97
<input checked="" type="checkbox"/>	5. Soil/Sludge/Sediment Sampling & Analysis	TS-11F	2,024.96
TOTAL SAMPLING AND ANALYSIS COST (Add lines 1 through 5) (Enter total on Worksheet TS-1, line 9)			17,662.02

**TS-11A: TANK SYSTEM
SAMPLE INVENTORY**

1 NUMBER OF DRILLING AND SUBSURFACE SOIL SAMPLES				In the
space below, identify the number of boreholes and the number of subsurface soil samples per borehole to be collected for each individual unit. Record the total number of samples to be collected in the box provided				
1	Number of Subsurface Soil Samples			
	Boring Diameter:	18	3	54
		boreholes	samples/borehole	total samples
2 NUMBER OF CONCRETE CORE SAMPLES				
In the space below, identify the number of concrete core samples to be collected for each individual unit. Record the total number of samples to be collected				
2	Number of Concrete Core Samples	0	total samples	
3 NUMBER OF WIPE SAMPLES				
In the space below, identify the number of sample locations and the number of wipe samples per location to be collected for each individual unit.				
3	Number of Wipe Samples:			
		25	3	75
		locations	samples/location	total samples
4 NUMBER OF SURFACE WATER/LIQUID SAMPLES				
In the space below, identify the number of grab samples taken on lakes, rivers, or ponds and samples taken of liquid wastes such as rinsate and surface water. Record the total number of samples to be collected in the box provided.				
4	Number of Aqueous Samples:			
		4	3	12
		locations	samples/location	total samples
5 NUMBER OF SOIL/SLUDGE/SEDIMENT SAMPLES				
In the space below, identify the number of grab samples taken of surface soil, sludge, sediment, or concrete chips and the number of samples per location to be collected for each individual unit. Record the total number of samples to be collected in the box provided.				
5	Number of Nonaqueous Samples:			
		6	3	18
		locations	samples/location	total samples

DRILLING AND SUBSURFACE SOIL SAMPLING & ANALYSIS

Notes	<p>a Because workers who are encumbered by health and safety equipment cannot perform activities as quickly as workers who are not encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours needed to conduct this activity</p>
b	<p>The estimated cost per work hour of all labor and equipment needed to collect boring and subsurface soil samples. Costs may vary significantly, depending upon the method of drilling to be used.</p>
c	<p>The estimated number of work hours per foot required to drill a 2½-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 2½-inch-diameter hole and collect a sample, a work rate of 0.750 (45 divided by 60) for conducting those activities is calculated. The work rate accounts for the time required to mobilize equipment, collect, handle, and pack the samples; and decontaminate the sampling team and all its sampling equipment</p>
d	<p>The estimated number of work hours per foot required to drill a 4-inch-diameter hole and collect subsurface soil samples. If, for example, it is estimated that it will take 45 minutes per foot to drill a 4-inch-diameter hole and collect a sample, a work rate of 0.750 (45 divided by 60) for drilling the hole is calculated. The work rate accounts for the time required to mobilize equipment, collect, handle, and pack the samples, and decontaminate the sampling team and all sampling equipment</p>

Estimated Analytical Cost per Sampling Event Reference for Line 3.A.

5/20/2010

CONCRETE CORE SAMPLING & ANALYSIS

1	COLLECTING CONCRETE CORE SAMPLES			
1.A	Number of concrete core samples to be collected (Enter from worksheet TS-11A, line 2)	0	core samples	
1.B	Level of PPE assumed for this activity (protection level D, C, or B) <i>a</i>	D	level of PPE	
1.C	Labor and equipment cost per work hour <i>b</i>	70.08	\$	
1.D	Work rate to drill a 3-inch-diameter core sample boring to a depth of 6-inches <i>c</i>	1.00	work hr/sample	
1.E	Number of hours required to drill 3-inch-diameter borings (Multiply line 1.A by Line 1.D) (One hour minimum; round up to the half-hour)	0.00	work hrs	
1.F	Cost to Collect Concrete Core Samples (Multiply line 1.C by line 1.E)		0.00	\$
2	ANALYZING CONCRETE CORE SAMPLES			
2.A	Determine the cost of analysis per sampling event for concrete core samples (Use table at the end of this worksheet to estimate)		\$/event	
2.B	Enter the number of sampling events	0	events	
2.C	Cost to Analyze Concrete Core Samples (Multiply line 2.A by line 2.B)		0.00	
UD				\$
TOTAL COST OF COLLECTION AND ANALYSIS OF CONCRETE CORE SAMPLES (Add lines 1.F and 2.C) (Enter total on worksheet TS-11, line 2)			0.00	\$

Notes

- a Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity.
- b The estimated cost per work hour of all labor and equipment needed to collect concrete core samples.
- c The estimated number of work hours required to drill a 3-inch diameter core sample boring to a depth of 6 inches. If, for example, it is estimated that it will take 45 minutes to drill one 3-inch diameter core sample boring, a work rate of 0.750 (45 divided by 60) for conducting that activity is calculated. The work rate accounts for the time required to mobilize equipment; collect, handle, and pack the samples, and decontaminate the sampling team and all sampling equipment.

Estimated Analytical Cost per Sampling Event Reference for Line 3.A.

Column 1 Analytical Parameter and Method	Column 2 Cost of Analysis (\$) per Parameter	Column 3 Number of Analyses, including QC Analyses a	Column 4 Total Cost of Analysis (\$) per Parameter per Event (Multiply Column 2 by Column 3)
Method USEPA 8260B Volatile Organics (Soils and Water)			
Method USEPA 8260B SIM Volatile Organics (Soils and Water)			
Method USEPA 8270C Semi volatile Organics (Soils and Water)			
Method USEPA 8270C SIM Semi volatile Organics (Soils and Water)			
Method USEPA 8282 Polychlorinated Biphenyls (Soils and Water)			
Method NWTPH-Gx (Soils and Water)			
Method NWTPH-Dx (Soils and Water)			
Method USEPA 8021B Purgeable Aromatic Hydrocarbons (Soils and Water)			
Method USEPA 6000/7000 Series Metals Analysis			
Method USEPA 8081 or 8085 Chlorinated Pesticides (Soils and Water)			
Method USEPA 1311 TCLP-Metals, VOAs, SemiVOAs			
TOTAL COST OF ANALYZING SUBSURFACE SOIL SAMPLES (Sum of all costs in Column 4) \$/event			0

TS-11D: TANK SYSTEMS
WIPE SAMPLING & ANALYSIS

1	COLLECTING WIPE SAMPLES		
1.A	Number of wipe samples to be collected (Enter from worksheet TS-11A, line 3)	75	samples
1.B	Level of PPE assumed for this activity (protection level D, C, or B) <u>a</u>	D	level of PPE
1.C	Labor and equipment cost per work hour <u>b</u>	124.995	\$
1.D	Work rate required to collect one sample <u>c</u>	0.5	work hr/sample
1.E	Number of hours required to collect all (Multiply line 1.A by line 1.D)	37.5	work hrs
1.F	Cost to Collect Wipe Samples (Multiply line 1.C by line 1.E)	4687.3125	\$
2	ANALYZING WIPE SAMPLES		
2.A	Cost of analysis per sampling event for wipe samples (Use table at the end of this worksheet to estimate).	3750	\$ /event
2.B	Number of sampling events	1	events
2.C	Cost to Analyze Wipe Samples (Multiply line 2.A by line 2.B)	3750	\$
UD			\$
TOTAL COST OF COLLECTION AND ANALYSIS OF WIPE SAMPLES (Add lines 1.F and 2.C) (Enter total on Worksheet TS-11, line 3)			8437.3125 \$

Notes:

- | | |
|---|--|
| a | Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct this activity. |
| b | The estimated cost per work hour of all labor and equipment needed to collect wipe samples. |
| c | The estimated number of work hours required to collect one wipe sample. If, for example, it is estimated that it will take 10 minutes per sample to collect wipe samples, a work rate of 0.167 (10 divided by 60) for collecting the samples is calculated. The work rate should account for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment. |

Estimated Analytical Cost per Sampling Event Reference for Line 2.A.

Column 1 Analytical Parameter and Method	Column 2 Cost of Analysis (\$) per Parameter	Column 3 Number of Analyses, including QC Analyses a	Column 4 Total Cost of Analysis (\$) per Parameter per Event (Multiply Column 2 by Column 3)
Method USEPA 8260B Volatile Organics (Soils and Water)			
Method USEPA 8260B SIM Volatile Organics (Soils and Water)			
Method USEPA 8270C Semi volatile Organics (Soils and Water)			
Method USEPA 8270C SIM Semi volatile Organics (Soils and Water)			
Method USEPA 8282 Polychlorinated Biphenyls (Soils and Water)	50	75	3750
Method NWTPH-Gx (Soils and Water)			
Method NWTPH-Dx (Soils and Water)			
Method USEPA 8021B Purgeable Aromatic Hydrocarbons (Soils and Water)			
Method USEPA 6000/7000 Series Metals Analysis			
Method USEPA 8081 or 8085 Chlorinated Pesticides (Soils and Water)			
Method USEPA 1311 TCLP-Metals, VOAs, SemiVOAs			
TOTAL COST OF ANALYZING SUBSURFACE SOIL SAMPLES (Sum of all costs in Column 4) \$/event			3750

SURFACE WATER/LIQUID SAMPLING & ANALYSIS

Notes

b The estimated cost per work hour of all labor and equipment needed to collect surface water/liquid samples.

c The estimated number of work hours required to collect one surface water/liquid sample. If, for example, it is estimated that it will take 10 minutes per sample to collect surface water/liquid samples, a work rate of 0.167 (10 divided by 60) for collecting the samples is calculated. The work rate accounts for the time required to mobilize equipment; collect, handle, and pack the samples; and decontaminate the sampling team and all sampling equipment.

Estimated Analytical Cost per Sampling Event Reference for Line 2.A.

Hydrodec Closure Costs - May 2010

SOIL/SLUDGE/SEDIMENT SAMPLING & ANALYSIS

Notes:

- Estimated Analytical Cost per Sampling Event Reference for Line 2.A.

Hydrodec Closure Costs - May 2010

**TS-12:TANK SYSTEM
TRANSPORTATION OF WASTE**

1	TRANSPORTATION OF WASTE IN DRUMS		
1.A	Number of drums of waste	30.00	drums
1.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste	1,000.00	\$ /truckload
1.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	1.00	truckloads
1.D	Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)	1,000.00	\$
2	TRANSPORTATION OF WASTE IN DRUMS		
2.A	Number of drums of waste		drums
2.B	Cost to transport one truckload of 55-gallon drums to the nearest treatment or disposal facility that will accept the waste		\$ /truckload
2.C	Number of truckloads needed to transport waste in drums (Divide line 1.A by 80 drums per truckload; round up to the nearest whole number)	0.00	truckloads
2.D	Cost to Transport Waste In Drums (Multiply line 1.B by line 1.C)	0.00	\$
3	TRANSPORTATION OF BULK LIQUIDS (Total Process - decontamination, soil, waste in drums)		
3.A	Gallons of liquid waste	18,568.00	gal
3.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste	7,000.00	\$ /truckload
3.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	3.00	truckloads
3.D	Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)	21,000.00	\$
4	TRANSPORTATION OF BULK LIQUIDS		
4.A	Gallons of liquid waste		gal
4.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste		\$ /truckload
4.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	0.00	truckloads
4.D	Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)	0.00	\$
5	TRANSPORTATION OF BULK LIQUIDS		
5.A	Gallons of liquid waste		gal
5.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste		\$ /truckload
5.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	0.00	truckloads
5.D	Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)	0.00	\$
6	TRANSPORTATION OF BULK SOLIDS		
6.A	Gallons of liquid waste		gal
6.B	Cost to transport one truckload of bulk liquids to the nearest treatment or disposal facility that will accept the waste		\$ /truckload
6.C	Number of truckloads needed to transport bulk free liquid waste (Divide line 2.A by 6,900 gallons per truckload; round up to the nearest whole number)	0.00	truckloads
6.D	Cost to Transport Bulk Liquid Waste (Multiply line 2.B by line 2.C)	0.00	\$
7	TRANSPORTATION OF BULK WASTE		
7.A	Number of waste debris boxes		debris boxes
7.B	Cost to transport one truckload of bulk waste to the nearest treatment or disposal facility that will accept the waste		\$ /truckload
7.C	Cost to Transport Bulk Solid Waste (assume one debris box can be hauled on each truck) (Multiply line 3.A by line 3.B)	0.00	\$
UD			\$
TOTAL COST TO TRANSPORT WASTE (Add lines 1.D, 2.D, and 3.C) (Enter total on Worksheet TS-1, line 10)		22,000.00	\$

**TS-13:TANK SYSTEM
TREATMENT AND DISPOSAL**

Check boxes below to activate sheet		SUMMARY WORKSHEET		
		Activity	Number Worksheet	Cost (\$)
<input checked="" type="checkbox"/>	1	Treatment and Disposal of Waste	TS-13A	1,701.00
<input checked="" type="checkbox"/>	2	Transportation and Disposal of Decontamination Fluids	TS-13B	134,766.61
TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1 and 2) (Enter total on Worksheet TS-1, line 11)				136,467.61

TS-13A:TANK SYSTEM
TREATMENT AND DISPOSAL OF WASTE

1	TREATMENT AND DISPOSAL OF WASTE 1 (SOLID)		
1.A	Volume of waste in yd3 to be treated or disposed of (If the waste is not recorded in yd3, use the factors in Table 1 of this worksheet to convert to yd3)	8.10	yd 3
1.B	Number of pounds per yd3 of waste (Select from Table 2 of this worksheet the density of material that most closely resembles the density of the waste to be treated or disposed of)	3,000.00	lb/yd3
1.C	Amount in lbs of waste to be treated and disposed of (Multiply line 1.A by line 1.B)	24,300.00	lb
1.D	Amount in tons of waste to be treated and disposed of (Divide line 1.C by 2,000)	12.15	tons
1.E	Treatment and disposal cost per ton	140.00	\$ /ton
1.F	Cost to Treat and Dispose of Waste 1 (Multiply line 1.D by line 1.E)		1,701.00 \$
2	TREATMENT AND DISPOSAL OF WASTE 2 (SOLID)		
2.A	Volume of waste in yd3 to be treated or disposed of (If the waste is not recorded in yd3, use the factors in Table 1 of this worksheet to convert to yd3)	0.00	yd 3
2.B	Number of pounds per yd3 of waste (Select from table 2 of this worksheet the density of material that most closely resembles the density of the waste to be treated or disposed of)		lb/yd3
2.C	Amount in lbs of waste to be treated and disposed of (Multiply line 2.A by line 2.B)	0.00	lb
2.D	Amount in tons of waste to be treated and disposed of (Divide line 2.C by 2,000)	0.00	tons
2.E	Treatment and disposal cost per ton		\$ /ton
2.F	Cost to Treat and Dispose of Waste 2 (Multiply line 2.D by line 2.E)		0.00 \$
3	TREATMENT AND DISPOSAL OF WASTE - 3 (LIQUID)		
3.A	Volume of waste to be treated or disposed of. Indicate units.		unit
3.B	Treatment and disposal cost per unit		\$ /unit
3.C	Cost to Treat and Dispose of Waste 3 (Multiply line 3.A by line 3.B)		0.00 \$
4	TREATMENT AND DISPOSAL OF WASTE - 4 (LIQUID)		
4.A	Volume of waste to be treated or disposed of. Indicate units.		unit
4.B	Treatment and disposal cost per unit		\$ /unit
4.C	Cost to Treat and Dispose of Waste 4 (Multiply line 4.A by line 4.B)		0.00 \$
5	TREATMENT AND DISPOSAL OF WASTE - 5 (LIQUID)		
5.A	Volume of waste to be treated or disposed of. Indicate units.		unit
5.B	Treatment and disposal cost per unit		\$ /unit
5.C	Cost to Treat and Dispose of Waste 5 (Multiply line 5.A by line 5.B)		0.00 \$
6	TREATMENT AND DISPOSAL OF WASTE - 6 (LIQUID)		
6.A	Volume of waste to be treated or disposed of. Indicate units.		unit
6.B	Treatment and disposal cost per unit		\$ /unit
6.C	Cost to Treat and Dispose of Waste 6 (Multiply line 6.A by line 6.B)		0.00 \$
7	TREATMENT AND DISPOSAL OF WASTE - 7 (LIQUID)		
7.A	Volume of waste to be treated or disposed of. Indicate units.		unit
7.B	Treatment and disposal cost per unit		\$ /unit
7.C	Cost to Treat and Dispose of Waste 7 (Multiply line 7.A by line 7.B)		0.00 \$
8	TREATMENT AND DISPOSAL OF WASTE - 8 (SLUDGE)		
8.A	Volume of waste to be treated or disposed of. Indicate units.		unit
8.B	Treatment and disposal cost per unit		\$ /unit
8.C	Cost to Treat and Dispose of Waste 8 (Multiply line 8.A by line 8.B)		0.00 \$
UD			\$
TOTAL COST OF TREATMENT AND DISPOSAL (Add lines 1.F, 2.F, and 3.C through 8.C) (Enter total on Worksheet TS-13, line 1)		1,701.00	\$

Table 1
Volume Conversion Factors

Volume: To Convert	Multiply By	To Obtain
Gallons	4.951×10^{-3}	Cubic yards
Cubic feet	27	Cubic yards
Liters	1.31×10^{-3}	Cubic yards
Cubic meters	1.308	Cubic yards

Table 2
Bulk Densities of Selected Materials ^a

Material	Bulk Density or Range (lb/yd³)
Water	1,685.8
Sludge	1,620 - 2,430
Soil ^b	2,025 - 3,240
Cement ^c	4,050
Demolition rubble	2,430 - 3,240
Steel ^c	13,230

Notes:

- ^a Densities are derived from the U.S. Environmental Protection Agency's Office of Solid Waste and Emergency Response (OSWER) Policy Directive #9476.00-6, 1987.
- ^b Soils rich in organic matter and soils that have large amounts of fine particles have lower bulk density than soils poor in organic matter and rich in sand particles.
- ^c Densities are derived from Standard Handbook for Civil Engineering, 3rd Edition, 1983.

TS-13B:TANK SYSTEM
TRANSPORTATION AND DISPOSAL OF DECONTAMINATION FLUIDS

1	Volume of decontamination fluid generated from closure activities. Add all volumes calculated for closure activity worksheet to determine the total volume of liquid to be transported and disposed of. For each line item, specify the structure or equipment being decontaminated and the amount of decontamination fluids generated.			
			gal	
			gal	
			gal	
			gal	
		18,568.00	gal	
	total gal	18,568.00	gal	
2	Level of PPE assumed for this activity (protection level D, C, or B) <i>a</i>	D	level of PPE	
3	Labor and equipment cost per work hour <i>b</i>	71.20	\$	
4	Work rate to pump decontamination fluid to a holding tank (per gallon) <i>c</i>	0.000067	work hrs/gallon	
5	Number of hours required to pump decontamination fluid to a holding tank (Multiply line 1 by line 4) (one hour minimum; round up to the half-hour)	1.24	work hours	
6	Subtotal of labor and equipment cost to pump decontamination fluid to a holding tank (multiply line 3 by line 5)	88.58		\$
7	Number of days of rental of holding tank (Round up line 5 to nearest 8 hours; divide by 8 hours per day)	0.16	days	
8	Holding tank rental fee (10,000 gallon capacity) (flat rate per day)	207.90	\$/ day	
9	Number of tanks required (Divide line 1 by 10,000 gallons; round up to the nearest whole number)	1.86	tanks	
10	Subtotal of tank rental costs (Multiply lines 7, 8, and 9)	60.03		\$
11	Removal cost per gallon of bulk liquid <i>d</i> (this figure is the default from R.S. Means, you can enter your own if you think this figure differs significantly)	7.25	\$/gal	
12	Subtotal of removal cost for bulk liquids (Multiply line 1 by line 11)	134,618.00		\$
UD				\$
TOTAL COST TO TRANSPORT AND DISPOSE OF DECONTAMINATION FLUID AS A BULK LIQUID (Add lines 6, 10, and 12) (Enter total on worksheet TS-13, line 2)				\$ 134,766.61

Notes:

- a* Because workers encumbered by health and safety equipment cannot perform activities as quickly as workers who are not so encumbered, requirements for higher levels of PPE will reduce the productivity of labor and equipment. PPE requirements therefore should be taken into account in determining the work rate and the total number of hours required to conduct each activity.
- b* The estimated cost per work hour of all labor and equipment needed to pump decontamination fluid to a holding tank.
- c* The number of work hours per gallon required to pump decontamination fluid to a holding tank. If, for example, a pump is used that can pump water at a rate of 5,000 gallons per hour, a work rate of 0.0002 hours per gallon (60 ÷ 5,000) ÷ 60 for conducting the activity is calculated.
- d* The estimated cost per gallon of transporting and disposing of decontamination fluid as a bulk liquid.

TS-14:TANK SYSTEM

CERTIFICATION OF CLOSURE

1	Number of units requiring certification of closure <i>a</i>	3		
2	Cost of certification of closure per unit <i>b</i>	12,035.24	\$	
TOTAL COST OF CERTIFICATION OF CLOSURE (Multiply line 1 by line 2) (Enter total on Worksheet TS-1, line 14)			36,105.71	\$

Notes:

- a* Facilities closing multiple tanks in the same manner at the same time should incur cost of certification of closure only once.
- b* This cost includes the cost of performance of the following activities by a registered professional engineer: 1) reviewing the closure plan, 2) conducting a final closure inspection at the unit, and 3) preparing a certification of closure report.

UNIT COSTS									
Sheet Reference	Item/Units	Rate	A	B	C	D	E	Crew	Reference Book
									Page No. CSI MasterFormat Number Notes
CS-4-1-C	\$	55.52	120.55	100.18	61.07			B-39	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Labor	51.13	102.20	85.22	51.13				
	Equipment	4.39	7.32	5.85	4.39				
CS-4-1-D	work hr/ft2	0.107						B-40	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
CS-4-2-C	\$	72.78	152.30	125.61	80.06			B-17	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Labor	51.46	102.92	85.77	51.46				
	Equipment	21.32	35.53	25.43	21.32				
CS-4-2-D	work hr/ft2	0.267						B-17	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
CS-4-2-H	\$/week	883.69							The Guide: Building Construction Material Prices for the Greater Seattle Area, 2009
									1-13 1665.01 1665.04 1665.05 1665.06
CS-4-2-J	\$	548.35							R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
									19-20 01 54 36.50 0020 01 54 36.50 0300 01 54 36.50 0600 01 54 36.50 1200
CS-5-3	\$	94.36	154.18	159.58	103.90			B-10L	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Labor	57.77	115.54	96.28	57.77				
	Equipment	36.59	60.98	43.79	36.59				
CS-5-4	work hr/ft2	0.33						B-10L	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
CS-5-8	\$/week	883.69							The Guide: Building Construction Material Prices for the Greater Seattle Area, 2009
									1-13 1665.01 1665.04 1665.05 1665.06
CS-5-10	\$	548.35							R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
									19-20 01 54 36.50 0020 01 54 36.50 0300 01 54 36.50 0600 01 54 36.50 1200
CS-6-2	compaction factor	0.25							U.S. Environmental Protection Agency, Final Guidance Manual: Cost Estimates for Closure and Post-Closure Care Plans (Subparts G and H), January 1987, EPA/530-SW-87-009, Volume III, pg 7-10
CS-6-5	\$	19.45	21.40	21.40	21.40				R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Materials	11.30							
	Compaction	1.50							
	Hauling 5 miles	6.65							
CS-6-7	\$	548.35							R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
									19-20 01 54 36.50 0020 01 54 36.50 0300 01 54 36.50 0600 01 54 36.50 1200
CS-7A-3	\$	54.88	118.81	98.68	60.37			B-9	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Labor	49.02	99.24	82.70	49.02				
	Equipment	5.20	8.77	7.01	5.20				
CS-7A-4	work hr/ft2	0.027						B-9	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
CS-7A-12	\$	263.50							R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
									31 02 81 20 10 1100
CS-7B-3	\$	91.20	184.00	159.89	102.12			A-1A	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
	Labor	93.25	126.50	105.42	63.25				
	Equipment	29.95	49.90	39.93	29.95				
CS-7B-4	work hr/ft2	0.036						A-1A	R.S. Means, Building Construction Cost Data, 67th Annual Edition, 2009
									230 09 05 05 20 0700

Code	Reference	Item/Code	Base	Rate	Unit	Qty	Cost	Notes
CS-10-1	275.74	CS-10-1	275.74					CS-10-1
CS-10-2		CS-10-2						CS-10-2
CS-10-3		CS-10-3						CS-10-3
CS-10-4		CS-10-4						CS-10-4
CS-10-5		CS-10-5						CS-10-5
CS-10-6		CS-10-6						CS-10-6
CS-10-7		CS-10-7						CS-10-7
CS-10-8		CS-10-8						CS-10-8
CS-10-9		CS-10-9						CS-10-9
CS-10-10		CS-10-10						CS-10-10
CS-10-11		CS-10-11						CS-10-11
CS-10-12		CS-10-12						CS-10-12
CS-10-13		CS-10-13						CS-10-13
CS-10-14		CS-10-14						CS-10-14
CS-10-15		CS-10-15						CS-10-15
CS-10-16		CS-10-16						CS-10-16
CS-10-17		CS-10-17						CS-10-17
CS-10-18		CS-10-18						CS-10-18
CS-10-19		CS-10-19						CS-10-19
CS-10-20		CS-10-20						CS-10-20
CS-10-21		CS-10-21						CS-10-21
CS-10-22		CS-10-22						CS-10-22
CS-10-23		CS-10-23						CS-10-23
CS-10-24		CS-10-24						CS-10-24
CS-10-25		CS-10-25						CS-10-25
CS-10-26		CS-10-26						CS-10-26
CS-10-27		CS-10-27						CS-10-27
CS-10-28		CS-10-28						CS-10-28
CS-10-29		CS-10-29						CS-10-29
CS-10-30		CS-10-30						CS-10-30
CS-10-31		CS-10-31						CS-10-31
CS-10-32		CS-10-32						CS-10-32
CS-10-33		CS-10-33						CS-10-33
CS-10-34		CS-10-34						CS-10-34
CS-10-35		CS-10-35						CS-10-35
CS-10-36		CS-10-36						CS-10-36
CS-10-37		CS-10-37						CS-10-37
CS-10-38		CS-10-38						CS-10-38
CS-10-39		CS-10-39						CS-10-39
CS-10-40		CS-10-40						CS-10-40
CS-10-41		CS-10-41						CS-10-41
CS-10-42		CS-10-42						CS-10-42
CS-10-43		CS-10-43						CS-10-43
CS-10-44		CS-10-44						CS-10-44
CS-10-45		CS-10-45						CS-10-45
CS-10-46		CS-10-46						CS-10-46
CS-10-47		CS-10-47						CS-10-47
CS-10-48		CS-10-48						CS-10-48
CS-10-49		CS-10-49						CS-10-49
CS-10-50		CS-10-50						CS-10-50
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CS-10-95		CS-10-95						CS-10-95
CS-10-96		CS-10-96						CS-10-96
CS-10-97		CS-10-97						CS-10-97
CS-10-98		CS-10-98						CS-10-98
CS-10-99		CS-10-99						CS-10-99
CS-10-100		CS-10-100						CS-10-100

Sheet Reference	Item/Unit	Unit	Price	Quantity	Cost	Notes
15-10-11	\$	7.25				Cost to remove bulk waste per gallon, plus 10% for third-party overhead/profit margin
15-2-3						
	Labor	179.37	320.47	260.68	179.37	Crew A-13, including O&P, plus 10% for third-party overhead/profit margin
	Equipment	58.70	117.40	97.83	58.70	
		104.36	113.93	139.15	104.36	
15-3-4	hr/gal	0.00033				2 hours/6000 gallons = 0.00033 work hours per gallon capacity
15-4-1	\$	2.64				Material cost for dry ice, plus 10% for third-party overhead/profit margin
15-4-5	\$	49.00	107.80	89.83	53.90	Crew A-1, including O&P, labor only, plus 10% for third-party overhead/profit margin
15-4-7	work hr/gal capacity	0.00024				500 lbs/day = 0.25 gal/hour = 0.00025 gal/hour = 0.00023 hr/gal
15-5-5	\$	179.37	320.47	260.68	179.37	Crew A-13, including O&P, plus 10% for third-party overhead/profit margin
	Labor	58.70	117.40	97.83	58.70	
	Equipment	104.36	113.93	139.15	104.36	
15-5-8	hr/gal	0.00033				2 hours/6000 gallons = 0.00033 work hours per gallon capacity
15-6-11	\$	263.50				0.00
15-6-11-G	\$	65.70	119.60	115.51	71.27	Crew B-4, including O&P, plus 10% for third-party overhead/profit margin
	Labor	52.23	104.46	87.05	52.23	
	Equipment	13.47	22.45	17.96	13.47	
15-6-11-D	work hr/m	0.15				Labor hours for "Pipe removal, Steel, Welded connections, 4" diameter"
15-6-2-G	\$	67.99	143.89	118.96	74.79	Crew B-13, including O&P, plus 10% for third-party overhead/profit margin
	Labor	52.48	104.96	87.47	52.48	
	Equipment	15.51	25.85	20.68	15.51	
15-6-2-D	work hr/gal capacity	0.0022				13,333 hours/6000 gallon capacity = 0.0022 hr/gal
15-6-11-G	\$	55.52	120.53	100.18	61.07	Crew B-39, including O&P, plus 10% for third-party overhead/profit margin
	Labor	51.13	102.26	85.22	51.13	
	Equipment	4.39	7.32	5.85	4.39	
15-6-11-D	work hr/m2	0.03				Labor hours for "Demolish, Remove Pavement and Curb, With hand held air equipment, Concrete 15" thick, no rebaring"
15-6-2-G	\$	72.78	152.30	125.61	80.06	Crew B-17, including O&P, plus 10% for third-party overhead/profit margin
	Labor	51.46	102.92	85.77	51.46	
	Equipment	21.32	35.53	29.43	21.32	
15-6-2-D	work hr/yd3	0.287				Labor hours for "Loading & hauling, including 2 mile haul, machine loading truck"
15-6-2-1	\$/week	833.69				1655.011665/041665/051665/0 includes 1 dump/week, plus 10% for third-party overhead/profit margin
15-6-2-2	\$	548.35				Average of 0020, 0300, and 0900 multiplied by 1.5 to cover additional 25 miles RT (base includes up to 50 miles RT), plus 10% for third-party overhead/profit margin
						01 54 36 50 0020 01 54 36 50 0300 01 54 36 50 0900 01 54 36 50 2500
15-6-3	\$	92.06	188.58	152.82	101.27	Crew B-55, including O&P, plus 10% for third-party overhead/profit margin
	Labor	48.55	97.10	80.92	48.55	
	Equipment	43.51	72.52	59.01	43.51	
15-6-4	work hr/yd3	0.03				Labor rate for "Excavating, Bulk, Doser, Open side, 80 H.P., 50' haul, Common earth"
15-6-5	\$/week	833.69				1655.011665/041665/051665/0 includes 1 dump/week, plus 10% for third-party overhead/profit margin
15-6-10	\$	548.35				Average of 0020, 0300, and 0900 multiplied by 1.5 to cover additional 25 miles RT (base includes up to 50 miles RT), plus 10% for third-party overhead/profit margin
						01 54 36 50 0020 01 54 36 50 0300 01 54 36 50 0900 01 54 36 50 2500

Sheet Reference	Item/Notes	Unit	Rate	Compensation Factor	Compensation Factor	Page No.	Cost Master Item Number	Notes
15-2								The compensation factor provided is for native soil for slope and fill.
15-2-1	Materials	10.45	21.40	21.40				
15-2-2	Compaction	1.50						
15-2-3	Hauling 10 mile round trip	6.65						
15-2-4		548.35						
15-2-5								
15-2-6								
15-2-7								
15-2-8								
15-2-9								
15-2-10								
15-2-11								
15-2-12								
15-2-13								
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Sheet	Request	Item/Notes	Rate	R.S. Salary Level	Crew	For Reference Only	Page No.	Crew Material Number	Notes
			0.50						Assuming 2 sample/hr
TS-11E-1.0		hr/sample							
TS-11E-1.1		\$ Labor	115.38 90.15	220.76 192.30	195.51 160.25	125.00 90.15			Based on Crew LLABI from R.S. Means, Environmental Remediation Cost Data - Unit Price, 11th Ed. 2005, p. 2-55. Labor costs are taken from current corresponding line items. See, eg. Crew B-80 on page 679 of 2009 Building Cost Data. Plus 10% for third party overhead/profit margin and 10% for disposable supplies.
TS-11E-1.2		Disposal Materials/sample	0.02	0.02	0.02	0.02			
TS-11E-1.3		Decontamination materials/sample	0.02	0.02	0.02	0.02			
TS-11E-1.4		hr/sample	0.50						Assuming 2 sample/hr
TS-11E-1.5		\$ Labor	115.38 90.15	220.76 192.30	195.51 160.25	125.00 90.15			Based on Crew LLABI from R.S. Means, Environmental Remediation Cost Data - Unit Price, 11th Ed. 2005, p. 2-55. Labor costs are taken from current corresponding line items. See, eg. Crew B-80 on page 679 of 2009 Building Cost Data. Plus 10% for third party overhead/profit margin and 10% for disposable supplies.
TS-11E-1.6		Disposal Materials/sample	0.02	0.02	0.02	0.02			
TS-11E-1.7		Decontamination materials/sample	0.02	0.02	0.02	0.02			
TS-11E-1.8		hr/sample	1.00						Assuming 1 sample/hr
TS-11E-1.9		\$ Labor	64.73	139.85	116.12	71.20			Crew B-10J, including O&P, plus 10% for third-party overhead/profit margin
TS-11E-1.10		Equipment	57.77 6.98	115.54 11.00	90.78 9.28	57.77 8.06			Rental of 10,000 gallon water tank, per day, plus 10% for third-party overhead/profit margin.
TS-11E-1.11		\$	207.90						Cost to remove bulk waste, per gallon, plus 10% for third-party overhead/profit margin
TS-11E-1.12		work hrs/gallon	7.25						15,000 gallons per hour = 0.000067 hour/gallon
TS-11E-1.13		work hrs/gallon	0.000067						Engineer III employment cost plus 200% for company overhead, profit margin, etc.
TS-11E-1.14		\$	12,035.24 7,355.59 4,679.65						Executive Assistant employment cost plus 200% for company overhead, profit margin, etc.
TS-11E-1.15		\$	12,035.24 7,355.59 4,679.65						Engineer III employment cost plus 200% for company overhead, profit margin, etc.
TS-11E-1.16		\$	197.23 79.35						Executive Assistant employment cost plus 200% for company overhead, profit margin, etc.
TS-11E-1.17		\$	117.88						Based on Crew H-LACC from R.S. Means, Environmental Remediation Cost Data - Unit Price, 11th Ed. 2005, p. 2-41. Labor costs are taken from current corresponding line items. See, eg. Crew B-85 on page 680 of 2009 Building Cost Data.
TS-11E-1.18		\$	0.000067						0.18 Truck @ \$370/day = \$66.60/day 2 Forklifts @ \$174/day = \$348/day 0.35 Flatbed @ \$122/day = \$42.70/day At plus 10% third party overhead/profit margin
TS-11E-1.19		work hrs/container	0.025						15,000 gallons per hour = 0.000087 hour/gallon
TS-11E-1.20		work hrs/container	0.025						Labor rate for loading drums listed at 40 cpm/hour = 0.025 work hrs/drum

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NOTES:
Adjustments for PPE (labor and materials) are based on RS Means suggestions and are calculated as follows:
Level D Labor - Base/100%
Level C Materials - Base/100%
Level C Labor - Base/50%
Level C Materials - Base/75%
Level B Labor - Base/50%
Level B Materials - Base/50%

